



Volume 4 Number 20
\$2.95

October 1, 1985

Building Business Images

Price-Waterhouse
Looks at 4-in-1
Accounting

The Sanyo 775 PC:
Fast, Colorful
& Portable

Printer Sharing
Options



PC-Based Graphic Design Tools

Introducing
the new
standard
in tape
backup
systems.





Maxell Gold.

The floppy disk
that keeps IBM® PC™
letter perfect,
helps Xerox 860®
write great copy,
and puts more bang
in Wang®.

Whether you're banging out a letter to Australia, creating a contract, or doing a case study on centipedes, dot every i with Maxell. The Gold Standard in floppy disks. Maxell is an industry leader in durability and error-free performance. There's a Maxell for virtually every computer made, and each comes with a lifetime warranty. That's why, when every word counts, you can count on Maxell.

maxell.
IT'S WORTH IT.®



Discover what 60,000

Discover the finest peripherals available in terms of features, reliability and price/performance. Corporations like IBM, General Motors and Exxon buy peripheral equipment from Qubie', and have for years. Check some of your old back issues of PC -- we've been satisfying PC owners since 1982.

Discover low prices, with service and support unparalleled in the microcomputer industry. Our 30 day No Risk Guarantee and 48 Hour Turnaround on warranty repairs is proof our products are first rate. We stand behind what we sell. We also offer our exclusive Preferred Customer Plan with 24 hour repairs and 24 months of coverage.



Discover money-saving prices that are the total prices. No small print telling you to add up for credit card charges or shipping and handling. Our prices include surface UPS charges and insurance. In a hurry? 2-day air UPS service is available.

Then discover it takes more than a low price to keep customers satisfied. We answer your questions and concerns before and after you buy.



HIGH RESOLUTION MONOCHROME MONITORS

HR 39 \$139
HR 134 \$149

Plugs Into IBM Monochrome Or Compatible Card • 720 x 350 Resolution • 12" Diagonal Screen • Super Crisp Text Capability • High Resolution TTL • HR 39 (Green) and HR 134 (Amber) • Includes Tilt/Swivel Base

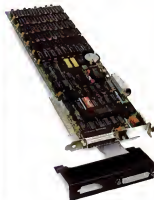


INTERNAL MODEM PC212A/1200 \$179

Auto-Dial, Auto-Answer • Runs Hayes Compatible Software Like Crosstalk, Smartcom II, and Sidekick • Two Phone Jacks Allow You To Hook Up Desk Phone • 300/1200 Baud Operation (Bell 103/212A) • RS-232C Serial Port • Includes Modular Phone Cord and PC-Talk III Software

PC MULTIFUNCTION CARD BT6Pins (84K) \$147.50 BT6Pins (384K) \$197.50

Memory Sockets For Adding Up To 384K • Parallel Printer Port • Asynchronous Serial Communications Port • BTPak Software (Disk Emulation and Printer Spooling) • Battery-Powered Clock/Calendar •



PC owners now know.

Optional Game Port •
Includes Dual Mounting
Bracket

STANDBY POWER SUPPLY

SB200 \$329
XT300 \$429
AT800 \$779



Noise Filtering/Surge Sup-
pression • Powers Your
Computer For Up to 30
Minutes In The Event Of A
Blackout or Brownout •
SB200 (200 Watt) For
Floppy-Based Systems •
XT300 (300 Watt) For Hard
Disk Based Systems •
AT800 (800 Watt) For
Multiuser Systems

EXTERNAL MODEM 212A/1200E \$199

NEW



Auto-Dial, Auto-Answer •
Runs Hayes Compatible
Software Like Crosstalk,
Smartcom II, and Sidekick •
300/1200 Baud Operation
(103/212A Compatible) •
RS-232C Serial Port Inter-
face • Includes Modular
Phone Cord • Eight Status
Indicators • Snap Hatch For
Easy Switch Access

AT ENHANCEMENT KIT BT44 Hard Drive & AT4X4Plus (\$12K) \$1495

NEW



44 Megabyte Drive • Runs
All The Popular AT Software
• 28 msec. Access Time •
Voice Coil Driven Heads
with Closed Loop Servo
Positioning • Full-Height
Unit • No Extra Chips Needed

AT MULTIFUNCTION CARD AT4X4Plus (128K) \$395 AT4X4Plus (512K) \$495



Memory Sockets For Adding
Up To 4 Megabytes • 1
Standard and 3 Optional
Serial Communications Ports
• Parallel Printer Port •
Game Port Option

No Risk Guarantee

If you are not completely
satisfied with your pur-
chase you return it within
30 days of purchase for a
complete refund, including
the cost to send it back. If
you can get any dealer or
competitor to give you the
same **No Risk Guarantee**, buy
both and return the one you
don't like.



HIGH RESOLUTION COLOR MONITORS HR31 200 \$399 HR31 350 \$499 WITH COLOR CARD, ADD \$120

14" Diagonal Screen • Black
Matrix Picture Tube • Plugs
Into IBM Color/Graphics or
Compatible Card • Dot Pitch
.31mm • HR31 200 (640 x
200) and HR31 350 (640 x
350) Resolution • Includes
Tilt/Swivel Base

For fastest delivery, send cashier's
check, money order, or order by
Mastercard/Visa. Personal checks,
allow 18 days to clear. Company
purchase orders accepted, call for
prior authorization. California res-
idents, add 6% sales tax.

Hours: M-F 9 am - 8 pm PTZ
Sat 9 am - 1 pm PTZ

London (01) 223-4888
Paris (01) 321-8316
Sydney (02) 679-3322
Canada (403) 436-0994



Outside California

800-821-4479

Inside California

805-987-9741

QUBIE'

4809 Calle Alto
Camarillo, California 93010



Retail



Distribution



Accounting

“What do we mean by *honest* accounting software?”

We mean software that does what it says it will do; it works in the real world.

What does RealWorld™ accounting software do?

Our fully integrated accounting line offers General Ledger, Accounts Receivable, Payroll, Accounts Payable, Order Entry, Inventory Control and Sales Analysis as honest solutions to your accounting problems. Our software runs on most popular micro-computers.

RealWorld software has been designed to suit your business accounting needs. Our software is built on the actual live feedback collected from our dealers and users over the last ten years.

An installed base of over 80,000 satisfied users has kept us in touch with the true needs of business accounting in the real world. An independent survey of computer retailers rated us #1 in technical performance, documentation, user friendliness, features and adaptability.

See for yourself what RealWorld can do

Seeing is believing—go to your local computer dealer and get a live demonstration of our software. You can enter real data about your real life accounting problems and see the results for yourself.

Insist on the accounting software that does what it says it will do. RealWorld is available at most major computer stores, or call us direct for the number of the dealer nearest you. Or send us the coupon below and we will mail the information to you without delay.



RealWorld Corporation
Dover Road
Chichester, N.H. 03263

1-603-225-9565

RealWorld is a trademark of RealWorld Corporation

I'd like more information about the Accounting Software that does what it says it will do and the name, address and phone # of the computer store nearest me that has RealWorld Accounting Software.

Name

Company

Address

City State

Zip Code Phone #

Hardware

Type of Business

PC100185

COVER STORIES/FEATURES



Design Tools for the PC 106

Stephanie Stallings/PC Magazine called in six artists to test six advanced graphic design packages for the PC. They ran each package through a series of standard exercises, and associate editor Stephanie Stallings worked their observations and insights, as well as her own, into the reviews that follow:

PaintPad 109

Despite many useful features, Vectrix's *PaintPad* gives hamburger capabilities to a file mignon hardware system.

PC Paint 112

PC Paint offers an intuitive interface, flexible fills, and loads of freehand drawing fun for a low price.

Lumena 114

Lumena is an outstanding drawing program that also offers you exotic options like video input and animation capabilities.

Imigit Plus 118

Chorus Data's *Imigit Plus* is a sophisticated system for enhancing photographic images captured with a video camera.

Artwork and Brushwork 122

West End Film's *Artwork* and *Brushwork* offer you the benefits of both vector-based and raster-based graphics technology.

Videogram 127

Softel Inc.'s *Videogram* is a flexible, full-featured drawing and design program that coaxes the maximum out of IBM's EGA.

COLUMNS/DEPARTMENTS

WHAT'S INSIDE 15

A behind-the-scenes glimpse into the making of *PC Magazine*.

PC NEWS 33

Nine pages of up-to-the-minute news from the computer community, product minireviews, interviews, short features, and commentary.

FROM THE EDITOR'S SCREEN

A Tale of 286s 59

Bill Machrone/PC Magazine set up an index-retrieval system at the recent *National Computer Conference*—and along the way discovered new meanings for the phrase "state of the art."

LETTERS TO PC MAGAZINE... 63

Readers share their insights, comments, questions, and criticisms.

THE NORTON CHRONICLES

Unearthed Treasures 81

Peter Norton/Norton enlightens us with a few facts about the Hewlett-Packard LaserJet and *Microsoft Word* that didn't make it into previous columns.

QUANTUM LEAP

The More Perfect PC 91

Ron Jeffries/A peek at the developing technologies that in the next few years may surpass today's standards in speed and memory specifications.

COMPUTERS IN SOCIETY

Flying Lizards and Computer Paranoia 96

Stephen Manes/Computer paranoia derives from the computer's capacity to do evil—through human inadvertence as well as by design.

PROGRAMMING

Double Duty Directory Display 189

Charles Petzold/DDIR alphabetizes your directory and splits it into two columns.

SPREADSHEET CLINIC 201

Jared Taylor/Users pass along the fruits of their spreadsheet experiences.



Page 145

SOFTWARE

A Partner in Graphics 139

Diane Burns and S. Venit/Looking for a way to make those spreadsheet-generated charts and graphs come to life? Besides being a simple and effective freehand drawing program, *The Graft Partner* can be called out of the background in a flash to inject three-dimensional color into your tired, colorless graphics.

Can SuperKey Soup Up Your Macros? 159

Dara Pearlman/The race for supremacy in the keyboard macro market heats up with Borland International's introduction of *SuperKey*. While essentially a *ProKey* clone, it offers some useful features and entertaining gadgetry of its own, like data encryption and a cut-and-paste facility.

HARDWARE

Upgrading Your 64K PC 145

Peter Feldmann/While the original IBM PC's upper limit of 64K bytes of RAM seemed gigantic when that machine was first introduced, it is a minuscule amount of memory by today's memory-intensive standards. If you were the proud owner of a PC in 1981, Add-Mem's memory enhancement kit combined with IBM's BIOS kit can enable you to meet the high memory demands of today's new, more powerful software.

The Sanyo 775 PC: Color on the Small Screen 150

Peter Feldmann/In speed, appearance, and price, the Sanyo MBC-775 resembles a Compaq with a color monitor. It is limited, however, by its inability to accept an add-on hard disk.

A Practical Look at Printer Sharing 175

Phil Wiswell/A multiple-access device can save you money if you can't afford the printer your company needs but are willing to share a printer with other users. Here's a look at five peripheral-sharing devices, one of which may be the key to solving all your hardware-sharing needs.

THE PRICE WATERHOUSE REPORT

4-in-1 Accounting:

The Basics from RealWorld 166

Thomas W. White and G. William Dauphinais/With RealWorld's 4-in-1 Basic Accounting program, small businesses can have some of the sophisticated accounting features found in the full-featured *RealWorld Software*, while remaining mercifully unencumbered by all the complicated and confusing features they don't need.



POWER USER 205

Charles Petzold/Helpful hints from the readers of *PC Magazine* about using hardware and software products more productively.

USER-TO-USER 217

Paul Somerson/PC Magazine readers share their helpful tips and short utility programs.

PC TUTOR 222

Charles Petzold/Answers to readers' technical and nontechnical questions.

REVIEWS IN BRIEF 225

A quick look at some new products.

THE SHORT REPORT 227

Phil Wiswell/Short takes on interesting new software. This issue's report looks at an on-disk lawyer, a home banking aid, and a computer calendar program.

NEW ON THE MARKET 229

David Obregon/Five pages of new product announcements. This issue features software to improve your baseball swing and a screen sculptor for dBASE II and III.

PC BLUEBOOK 234

A quick-reference guide for PC owners, featuring a variety of computer hardware, software, and services.

BOOK REVIEW

Explaining the Inexplicable 245

Phil Wiswell/Two books, *The Cognitive Computer* and *The AI Business*, offer insight into the fascinating arena of artificial intelligence research.

PC:MART 248

PRODUCT INDEX 254

Products in the pages of *PC Magazine*.

INDEX TO ADVERTISERS 257

COMING UP 253

Cover Photograph: Roberto Brosan



International Connections

With the industry's most popular data communications program, the world is at your command.

An import/export office in New Jersey can instantly check the London market for current dollar exchange rates ... send Hong Kong an updated production schedule ... print-out the week's sales results from the Dallas branch.

There's virtually no limit to how far you can reach with your microcomputer, ordinary telephone lines, and CROSSTALK.

Even if your own business and personal needs are closer to home, you'll appreciate CROSSTALK's compatibility with a wide user base ... smart terminal characteristics ... total modem control ... and the ability to capture data at a high speed for later off-line editing. CROSSTALK has extras you may not find in other programs. Data capture to memory buffer (and on-line display). Protocol error-checking file transfer. Modem/telephone hangup, and display of elapsed time of call. Command file power and flexibility. Remote takeover and operation. And much more.

There is a CROSSTALK version for almost every CP/M, CP/M-86, or IBM DOS based microcomputer system. See your dealer, or write for a brochure.



CROSSTALK

MICROSTUF®

1000 Holcomb Woods Parkway / Roswell, Georgia 30076

CROSSTALK is a trademark of Microstuf, Inc. CP/M and CP/M-86 are trademarks of Digital Research, Inc. IBM is a trademark of International Business Machines, Inc.

CIRCLE 326 ON READER SERVICE CARD

FOR THE FIRST TIME... HIGH PERFORMANCE BACKUP AT A FLOPPY TAPE PRICE



WHO NEEDS FLOPPY TAPE !!

The Everex EXCEL STREAM-20 Cassette Backup System

- No extra expansion slot needed
- High Speed—up to 10MB in just 2 minutes
- No time-consuming pre-formatting
- 20MB backup capacity
- Same price as 10MB floppy tape systems
- Internal and external models for the PC, XT and AT

Replace your floppy disk controller with Everex's combination cassette AND floppy disk controller—no extra cost, no extra slot needed. Data is automatically verified/corrected and the tape is pre-formatted during backup—saving you the 30 minutes you waste to format and verify with a floppy tape system. The STREAM-20 includes the most advanced backup/restore software. The choice is simple—the Everex EXCEL STREAM-20 Cassette backup system—High Performance backup at a floppy tape price. Visit your local Everex Dealer today and ask to see the STREAM-20 in action. For the name of your nearest Everex Dealer, please call 415-498-1111.

Address: 47777 Warm Springs Blvd.
Fremont, CA 94539
TELEX: 5101000590 EVEREX
FAX: 415-651-0728

Dealer Hotline: (800) 821-0806
in CA (800) 821-0807

	EVEREX EXCEL STREAM-20	Floppy Tape	System Image
Capacity	20MB	10MB	10MB
No extra slot needed	•	•	•
Backup time for 10MB	2min.	4min.	4min.
Automatic Verification	•	•	•
Automatic formatting	•	•	•
File-by-file Restore from Image backup	•	•	•
Internal Model	•	•	•

EXCEL STREAM-20 is a trademark of Everex Systems Inc.

EVEREX
ENTER A COMPANY

We put hard disk storage and backup where it belongs.

Maximum storage in a minimum space.

A mass storage solution for personal computers need not occupy massive amounts of space.

That's why Kamerman Labs packs an entire hard disk storage and backup system into a package only 2½ inches high.

In fact, our Masterflight system is so well integrated with your PC, it looks like it should have been there all along.

Hard disk storage.

Inside the Masterflight is a high-performance hard disk system, available in 10, 20 or 30 Megabyte versions. You get up to 100 times the storage capacity of floppies. At up to 10 times the speed. Spend more time working and less time waiting.

Streamer tape backup.

Any professional working environment demands a reliable backup solution. The Masterflight provides it through a high-performance streamer tape that backs up an entire 10 Megabytes in less than 4 minutes. Streamer tapes are available in 20, 40 and 60 Megabyte capacities. Instead of just a hard disk, Masterflight gives you a complete data storage solution.

Power control.

Masterflight directs power to your computer, monitor, printer and two other devices through front panel switches. No more blind groping on back panels to power up your system.

Surge protection.

A little power surge can produce a lot of damage. Masterflight protects your system with special circuitry that filters out spikes, surges and line noise.

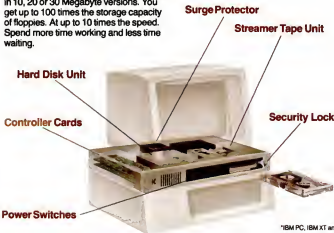
Security.

Masterflight guards access to your system through a fully lockable power switch.

Phone today. Dealer and OEM

queries welcome. 800-522-2237

In Oregon, Hawaii and Alaska call 503-626-6877



K Kamerman Labs

8054 SW Nimbus, Bldg. 6
Beaverton, OR 97005
Phone 503-626-6877

CIRCLE 317 ON READER SERVICE CARD

PreCursor™ Makes The Hard Disk Easy.



Only
\$69.00

30-DAY MONEY BACK GUARANTEE

PreCursor™ is an amazingly compact and sophisticated indexing system for your hard disk. It runs just ahead of your other applications and makes some very user-friendly arrangements. And at a very businesslike price.

Without PreCursor™, it takes a whole manual of commands to find and execute programs from your hard disk. In a business setting, where novice users must access your system, this is aggravating and expensive.

Tailoring PreCursor™ to your system is an easy operation. On-line help is available at the touch of a function key. A triple level of password protection is built right in. You don't need to know paths or subdirectories or other complicated syntax. You can even change the color of PreCursor™.

After PreCursor™ is setup on your hard disk, it greets you each time the machine is turned on with a list of available programs. You can make simple index choices of even the most complex DOS commands. And set up your printer with the speed and ease of an old pro.

If you're a sophisticated user, you'll love the convenience of full interaction with batch files, passable parameters and user prompts. Home users will appreciate the sure ease of operation.

If you depend on your hard disk for businesslike performance, you can rely on PreCursor™ for instant access.

Thanks to PreCursor™, The Hard Disk isn't so hard anymore.
CIRCLE 196 ON READER SERVICE CARD

Dealer Inquiries Welcome
PreCursor™ will run on IBM compatible MS-DOS systems.
IBM is a registered trademark of International Business Machines Corporation.

Make My Hard Disk Easy!

- ☐ Have my order for _____ copies.
☐ Find my check for \$69.00 each enclosed (plus \$5.00 for postage and handling).
☐ Please charge this purchase to my ☐ Visa ☐ MasterCard •

Card # _____ Exp. Date _____

Name _____

Title _____

Company Name _____

Address _____

City _____ State _____ Zip _____

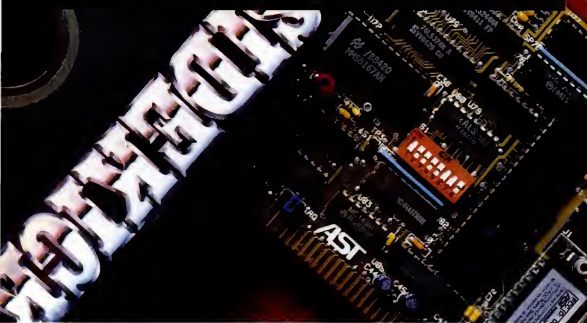
Texas residents add 5.121% sales tax. (Excludes residents—5.121%).
 Outside U.S. please add \$15. Checks must be on a U.S. bank
 and in U.S. dollars. Sorry, no C.O.D. or purchase orders.

Send to PreCursor™

The David L. Aldridge Company, Inc.
 140 Town & Country Village, Houston, Texas 77061
 To place credit card orders by telephone, call (713) 464-7463 or,
 toll free, call 800-538-6557. In Calif. call 800-457-9622.

PreCursor

SixPakPlus SideKick



The #1 Multifunction Card Now Includes The #1 Desktop Management Software

The Best Multifunction Card Just Got Better. We've enhanced our SixPakPlus multifunction card with a new extra feature: Borland's SideKick desktop management software. Now you can get the best the industry has to offer together in one package—in 1984 SixPakPlus was voted the #1 multifunction card in PC World's World Class User Survey and chosen as Softset's Best Selling New Product, while SideKick was selected as InfoWorld's Software Product of the Year.

The Best In Performance. Over 400,000 satisfied customers will tell you SixPakPlus provides the power for today's demanding requirements, whether you use an IBM® PC, XT, 3270 PC or compatible.

First there's more memory—an additional 64 to 384K RAM—to process more data, or to run today's software programs such as the SideKick multipurpose software we've included. Our extra memory and SideKick's features also work beautifully with your other favorite software packages like Lotus 1-2-3™, WordStar®, Symphony™ and dBASE III™.

Next, more Input/Output ports—one serial, one parallel and an optional game adapter—to add peripherals such

as printers, modems, a mouse, plotters or joysticks. Then there's our built-in clock-calendar for automatic time and date stamping.

And we've included another of our "World Class" award winners, SuperPak™ utility software. Selected top in its class for two consecutive years, SuperPak features SuperDrive™ which works like a drive but fifty times faster, and SuperSpool™ which lets you print and input at the same time.

The Best in Quality. If the industry's lowest rate of return is a good indicator, then SixPakPlus can't miss when it comes to quality. And we back this dedication to quality with a dedication to service and support. The AST commitment even extends to documentation, with our comprehensive user information you'll find SixPakPlus is also the easiest to install and operate.

It takes an industry standard to advance the standard. When you want the best, look to AST's SixPakPlus—with the added value of SideKick software. For more information call our Customer Information Center (714) 863-1333. AST Research, Inc., 2121 Alton Avenue, Irvine, CA 92714 TWX: 753699 ASTR UR
CIRCLE 104 ON READER SERVICE CARD

SIXPAKPLUS FEATURES

- Includes SideKick Desktop Management Software
- Memory Expansion to 384Kb, allowing total PC memory expansion to 640Kb
- Serial port for connecting to a printer, mouse, modem or other asynchronous devices
- Parallel port for use with parallel printer plotters
- Optional game adapter port—plug in joysticks and other cursor-control devices
- Battery backed Clock/Calendar for automatic time and date stamping
- AST's SuperPak includes SuperDrive electronic disk and SuperSpool print spooler



SixPakPlus, SuperPak, Super Drive and SuperSpool trademarks
AST Research, Inc. SideKick trademark
of Borland International. IBM registered trademark
of International Business Machines Corp. Lotus, 1-2-3 and Symphony trademarks
of Lotus Development Corp. WordStar registered trademark of
MicroPro International Corp. dBASE III trademark of Ashton-Tate

AST RESEARCH INC.

"Keyworks is a wonderful product that's miles ahead of its competition. It redefines the nature of keyboard enhancers and it may well be one of the most important products released this year."

—PC Week
June 18, 1985



Keyworks is a registered trademark of Alpha Software Corp. Alpha Software is a registered trademark. SuperKey and SideKick are trademarks of Borland International, Inc., and ProKey of RoadSet. © 1985 Alpha Software Corp.

CIRCLE 143 ON READER SERVICE CARD

If you want to know why Keyworks is miles ahead of the competition, send a check for \$89.95. If after 60 days you are not delighted by Keyworks, we'll refund your money. Or if you own SuperKey or ProKey send a check for \$49.00 along with proof-of-purchase and we'll send you a copy of Keyworks to compare.
TO ORDER CALL: 1-800-451-1018
(In Ma. 617-229-2924)

Attention SideKick Owners: Keyworks has direct interface.
Keyworks™

To order by mail, clip your business card with a check to this coupon and send to Alpha Software Corp., 30 B Street, Burlington, MA 01803. For the location of your nearest Keyworks dealer call 1-800-556-2283.

PCW 1/101

Free Christmas pies in every box.

Put in your thumb and pull out a plum.
Namely, Boardroom Graphics.[®]

From now 'til Christmas* you'll find a free copy of this highly-acclaimed business graphics program in every specially-marked box of Dysan[®] DS/DD diskettes.

Boardroom Graphics lets you turn data from your spreadsheets and other databases into 3-D graphics. Line charts. Scattergrams. Bar graphs. Cluster bars. And, of course, pie charts.

Just boot it up on your IBM[®] PC, XT or compatible.** Follow the

easy-to-use menus. You'll be cooking up tasty presentations in no time.

To get the free software, of course, we do ask that you buy the Dysan diskettes. After all, what better place to store your Christmas pies?

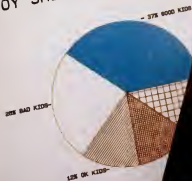
See your Dysan dealer today or call (800) 233-5099.

And say Santa sent you.

Dysan[®]

Somebody has to be better
than everybody else.

SANTA INDUSTRIES INC.
TOY SHIPMENTS BY KID TYPE



XZY CORP.
CAPITAL E



XZ
CAPITA

YEAR

*Quantities are limited. **Requires appropriate hardware and 128K RAM. Dysan is a registered trademark of International Business Graphics, © 1984, Mark Haley. © 1985, XZY Corp.

CIRCLE 289 ON READER SERVICE CARD

10% LAND



What's Inside

The artist-testers for this issue's computer graphics roundup found the artistic possibilities of their packages so enchanting that they didn't want to stop playing.

Enthusiasm is a very convenient sentiment to have around a magazine. If product testers are motivated only by pride and economics, their work will, of course, be quite satisfactory to all concerned. However, when they are also fascinated as much by the professional potential as by the technology of a package, it makes examining that product much easier, faster, and—let's face it—more fun.

Take the participants in this issue's graphics package roundup. To test six of the representative graphic design programs for the IBM PC, *PC Magazine* brought in six artists and gave them the type of assignment that they might have received on a regular job: Work up an advertising illustration concept for a new computer software firm and its premier product.

Graphics Redux?

Regular readers of *PC Magazine* may remember that we did a large-scale review of business graphics software only a few issues ago. Why, they may not unreasonably ask, this sudden concentration on graphics programs?

Well, until recently, good graphics software and hardware were hard to find. However, the technology for graphics on the IBM PC has been slowly but steadily improving in recent months—so much so that \$100,000 systems of 5 years ago can now be replicated on a PC for about \$15,000. And the software for these same systems has become easy enough to use that more and more artists can make use of computers as graphic tools without



having to spend time learning how to program.

No Stranger

Of course, some artists have not been patient enough to wait for easy-to-learn systems. Tom Christopher, for example. Christopher was no stranger to *PC Magazine* when we called him and asked him to take a look at *PaintPad Video Art Software*. For the past few years, he has reviewed several graphics programs for us and has also used computers extensively in his own art.

As a result, Christopher had no problem in immediately sitting down and getting to work on his concept for the CompuKids advertising campaign. However, he did suffer from a difficulty that afflicts many a computer enthusiast—he plunged right into the program

without more than a sidelong glance at the manual. This approach, of course, almost always led to long pauses during which Christopher, after some futile experimentation, would give up the fight and resort to the printed material. After a few such skirmishes, he finally succumbed to the inevitable and read the manual.

Computer Converts

Martha Gradisher, who worked with *PC Paint*, was somewhat newer to computer graphics and so didn't have quite the same aversion to reading the manual. On the other hand, Gradisher, an illustrator, still had not recovered from the reaction that plagues many users of unfamiliar software: "If I do something wrong, will it blow up?" To prevent that possibility, she explored *PC Paint* in a much more methodical manner.

But once she finished with the preliminaries and began to actually use the package, she underwent a transformation. The computer had become a tool, a means to an end; Gradisher the artist took over from the reviewer. If it worked, she used it; if it didn't work, she changed it. It was that simple.

To give the artists sufficient time to learn and test their assigned programs, we set aside 3 days for each one. However, exceptions to that time schedule did crop up. Maureen Jones, who was working with *Lumena*, found that she needed another 2 days to explore the highly complex package. But even that wasn't enough time; for when Friday rolled around and the assignment was com-

WHAT'S INSIDE

plete, Jones was having so much fun that she asked if she could come in Monday on her own time just to play with it a little more. Of course, we assented. How could we refuse?

Artistic Tool

Like Gradisher, Mark Falls (*Imigit Plus*) and Judith Miller (*Artwork* and *Brushwork*) were less interested in graphics software as a function of a com-

puter than as an artistic tool. A quiet worker, Falls would come in around 9:30 each morning, sit down and work to 6 or 7 each evening, learning new functions and carefully applying them to his developing illustration. To Falls, it didn't matter how often he had to invoke a function or redraw a pattern, as long as the final product was exactly what he had been looking for.

Miller, who had been led to believe that *Artwork* was a relatively simple program, found herself facing something highly complex. She also simply sat down each morning and set to work, and although she needed the entire week to really explore all of *Artwork's* different



A BETTER WAY TO...

DRAW, POINT, SELECT & POSITION

For graphics, and menu selection — for direct interaction with your computer — nothing beats a light pen. It's fast. It's natural. And unlike a mouse, it won't fight with you for desk space.

Over 7500 FTG light pens are in use world-wide — they're the undisputed standard for the IBM PC.

Software is available for graphics, education, 3278 emulation, and much more. Plus, our MOUSETRAP™ is the link to most programs that can use a mouse. And, if you do any programming, you'll find it easy to add light pen support to your own creations.

For added versatility, check out our new PXL-350 HI-RES LIGHT PEN BOARD. It's fully supported by the DR. HALO II™ graphics program.

The pen is \$195. The board is \$149 with single-pixel and TopView™ interface software. We back both with a 30-day no-risk trial privilege and a two-year limited warranty.

Call today to try them, or for more information.



FTG DATA SYSTEMS

soon to be GRAPHIC INNOVATIONS, INC.

10801 Dale, Suite M-2, P.O. Box 615, Stanton, CA 90680 Telex: 887840

(714) 995-3900
(800) 962-3900
(800) 972-3900 (Calif.)

The technology for graphics on the IBM PC has been slowly but steadily improving in recent months.

facets, by Friday she had produced an interesting and professional piece of work. She had also developed a new respect for microcomputer graphics.

Home Brew

Cindy Lorimer was very familiar with microcomputer graphics when she cheerfully bounced into our offices and immediately began to explore her assigned package, *Videogram*. Unlike our other reviewers, she did have one important commitment that prevented her from spending quite as much time on our computers: a very new baby. However, that commitment didn't stop Lorimer for a moment; she simply configured her home computer for *Videogram* and did much of her design work in the convenience of her own home.

Some of our medically educated readers may have noticed that Lorimer's final product features a pretty accurate rendering of the human brain. This accuracy is no accident—she had just finished designing a body of medical illustrations aimed at physicians. As a result, Lorimer found an assignment to design an advertisement for a product called Cranium Thought Processor little strain.

Lots of dollars.



Lots of sense.



\$69.95

They've been doing it for years. Selling you accounting software module by module, till before you know it you've paid up to five thousand dollars for a complete system. That's a lot of dollars... which doesn't make good business sense.

Now, there's a better alternative. Dac Easy Accounting. For only \$69.95, Dac Easy is a fully integrated accounting package offering instant access to General Ledger, Accounts Receivable, Accounts Payable, Inventory, Purchase Order, Billing and Forecasting. And Dac Easy has the flexibility to manage either product or service oriented businesses.

It's not just the price that makes Dac Easy better. Only Dac Easy saves three years of history in all files, making automatic forecasting easier and more accurate. Plus, you can generate any of 300 different reports for instant access to the exact information you need.

Dac Easy is menu-driven for ease-of-use, and comes with easy-to-understand documentation inside a handsome slip-case binder. It's also non-copy-protected. Listen to what experts are saying:

"Dac Easy Accounting is remarkable, amazing, revolutionary, sensational..."
Computer Buyer's Guide & Handbook, September 1985

Find out for yourself why Dac Easy is the fastest selling accounting package in history. Compare Dac Easy's range of features against systems costing thousands more. You'll see how Dac Easy can save you lots of dollars. Which makes a lot of sense.

PARTIAL LIST OF FEATURES

General Information

- Menu driven
- Password protection
- File capacity limited only by disk space
- Support contract available

General Ledger

- Unlimited multi-level accounts
- Three-year account history for CRT inquiry
- Pencil and pen feature to correct mistakes
- Unique budgeting routine
- CRT transaction inquiry
- Activity report, trial balance, financial statements, unlimited departments and journals

Accounts Receivable

- Open invoice or balance forward
- Customized aging report
- Unlimited number of customers
- Flexible mailing labels and directories
- Supports partial payments & finance charges
- Three-year customer history for number of invoices, sales, costs, and profits
- Customized statements
- Cash flow analysis/sales analysis
- Automatic sales forecasting

Accounts Payable

- Check printing with multiple invoices and cash available routines
- Aging reports with seven customized columns
- Unlimited number of vendors
- Flexible mailing labels and directories
- Three-year vendor history
- Standardized allocations per invoice

Inventory

- Supports average, last purchase, and standard costing methods
- Powerful physical inventory routines
- Accepts any unit of measure
- Three-year product history in units, dollars, cost, and profits
- Automatic forecast of product sales
- Automatic pricing assignments
- Alert and activity reports with 11 sorts
- CRT shows on-hand-on-order-committed/sales/cost/profit

Purchase Order

- Inventory and non-inventory items
- Allows up to 99 lines per PO
- Per line discount in %
- PO accepts generic discounts/freight/taxes/insurance
- PO accepts back orders and returns
- Purchase journal

Billing

- Service or inventory invoicing on plain or preprinted forms with remittance
- Prints sales journal
- Allows return credit memo
- Unique program that automatically forecasts using your three-year history
- Estimates item usage
- Vendor purchases
- Customer sales, cost, and profit
- Inventory item usage
- Forecast by same as last year, or % base from last year, or trend, or least square trend line analysis method

Dac Easy Accounting

To Order Call Toll Free

1-800-431-0800

Ask For Operator 2101

For More Information Or In Texas Call

214-458-0038

© dac software, inc. 4801 Spring Valley, Building 110-B, Dallas, TX 75244

Send in this coupon with your credit card number, money order or check for \$69.95 plus \$7.50 for postage and handling. In Texas, add 6 1/4% sales tax (\$4.28). Outside U.S., add \$17.50 for postage and handling. No C.O.D.

☐ CHECK ☐ MONEY ORDER
☐ AMEX ☐ VISA ☐ MASTERCARD Expires _____

Account No. _____

Name _____

Company Name _____

Address _____

City _____ State _____ Zip _____

Phone _____

Signature _____

30 Day Money Back Guarantee: dac software, inc. provides a 30-day money back guarantee that all claims and features listed in this ad are true.

Minimum Hardware Requirements:
IBM (PC, XT, or AT) or other compatibles, 128K memory, one 5 1/4" DSD floppy disk, 132 column printer in compressed mode, 80X24 CRT, MS-DOS 3.0, PC DOS 3.0 or later.

Trademarks of International Business Machines Corporation.
Trademark of Microsoft Corporation.

Dac Easy Accounting

2101

CIRCLE 148 ON READER SERVICE CARD

AT Power.

High performance, high capacity hard disk subsystems

A Single DOS Volume up to 240 formatted MBytes in size on your PC is only the beginning of Emerald subsystems' features. However, it is a very important one to many of our customers.

Most serious micro computer users are familiar with the infamous 32 MByte DOS Barrier. Some of you have only read about it; others have run up against it head on when trying to run PC Focus or a downloaded mainframe program.

If you are one of those who have hit it head on you'll be pleased to know that for almost a year Emerald has been shipping fixed disk subsystems that solve your problem. Subsystems. Plural.

All Emerald subsystems can be operated as a single volume up to their formatted capacity. That includes our 36, 50, 70 and 140 MByte subsystems, in addition to the 280.

drive and an Emerald subsystem with a 70, you can use *all* your storage as a single 90 MByte volume. Disk melding makes it easy to combine Emerald drives with each other or with your existing drive to get a subsystem with the storage capacity you need.

Operating System and Network flexibility is yours for the asking. DOS 2.X, and 3.X will get you started. But, your Emerald subsystem can also support multi-user operating systems such as XENIX, VENIX, QNX and PCIX and networks such as Novell, Sytek, Ungermann-Bass, 3 COM, X-Net, 10 Net, DNA Systems...

Additional Features include password security, 30 millisecond average access time, automatic retreat to a safe landing zone in the event of power failure or shutdown, and a long list of PC and AT compatible micro computers.

High performance 1/4" tape backup

60 MBytes in 12 minutes is *FAST* backup, but there's more. If your files are larger than 60 MBytes, Emerald's Backup and Restore Utility (BRU) software will automatically break your file into 60 MByte sections and prompt you for a new cartridge. Of course, restoring is just as easy.



Compact tape drive fits in the AT's front panel expansion space. 60 MByte cartridges are certified for high performance and supplied with color coded labels.



Emerald subsystems were designed for the PC, AT and compatibles such as the AT&T 6300 and Compaq DeskPro.

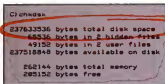
Menu driven software makes it simple, even for novices, to backup or restore exactly what is needed, and no more. Choose one or more files that were modified after a Specified Date and Time, one or more Specific Files or Directories, or All Files and Directories on a DOS Logical Volume.

Restore data on a different micro if you like. Backup up your company's Emerald subsystem in Portland, Maine and ship the tape to your office in Los Angeles. Because of the defect mapping technique used on Emerald hard disks, the subsystem in L.A. will import your data error free.



Special defect mapping technique allows data to be restored on subsystems other than the original source.

The BRU software automatically checks, and adjusts to, the defect map of every Emerald subsystem before restoring data to it.



Actual printout of CHKDSK on 240 MByte volume.

You Determine how many volumes exist in your PC, and what size they are. You can have as many as 24 volumes, and make each one exactly the size it needs to be.

Set-up is menu driven and as simple as "How many do you want?" and "How big should this one be?"

Integrate your existing hard drive into your new subsystem. Emerald's Disk-Meld technology makes it possible for your XT's 10 Mbyte, or AT's 20 Mbyte drive to become part of a single large volume. For example, if you have an AT with a 20 MByte

is Yours.

Configured for today's Micros

The Physical Design of the Emerald subsystems lets you determine the configuration that will best serve your needs. Many of today's high performance micros have sacrificed expansion space in favor of compact size; others offer plenty of room for additional drives, tape units and expansion cards. Emerald subsystems provide you with the expansion ability you need. And, they're designed to allow you to continue to expand as your needs continue to grow. No matter which PC you have, there is an Emerald subsystem that will meet your needs.



Subsystems are available for the PC, AT and true compatibles in a variety of configurations.

Internal Expansion is easy on the IBM AT and XT. Emerald subsystems are pre-initialized and pre-formatted—just slide the tape or hard drive you have selected into one of the existing expansion areas, plug in a couple of cables, tighten a few screws and replace the system cover. Elapsed time: 10/15 minutes.

The AT accepts 280 MBytes or any single drive up to 140 MBytes and a 1/4" tape drive. The XT accepts any Emerald hard drive up to 140 MBytes in size, or the 1/4" tape drive.

External and Portable expansion is easy and practical with the Emerald Portable Subsystems. These IBM color-matched subsystems have their own power supply and are available with hard drives up to 140 MBytes in capacity or with a 1/4" tape drive.

Ordering a tape host adapter card for each of your PCs and physically moving the 1/4" portable tape subsystem to where it is needed will save you thousands of dollars over the cost of individual portables for each micro.

The portable hard drive configuration is ideal for security sensitive environments. The hard disk is password protected and the entire subsystem is small enough to be locked in a standard safe or filing cabinet.



"Expansion chassis" subsystem also provides 6 additional spaces to add cards to your PC.

The 6 Expansion Slots in the Emerald expansion subsystems will be a welcome addition to many micros. If you don't have enough expansion room in your micro, or, if you've used every available slot, then one of these subsystems is just right for you. They are closely matched to the IBM PC in size and color, and have their own, built-in, power supply.

Expansion subsystems are available with drive sizes to 280 MBytes in capacity, with, or without, a built-in 1/4" tape drive. When coupled with an AT a truly powerful computer system results.

The real backup procedure

Standing Behind You all the way is the company that broke the 32 MByte DOS barrier.



Documentation, host adapter card, software and cables are included with each subsystem.

First, we provide everything needed to get you up-and-running quickly. Then, we back you up with specialists, available 16 hours a day, to help with network implementation, applications support, XENIX and technical questions, and to provide 48 hour in-and-out repair service.

Delivery and Warranty are important considerations. Your Emerald subsystem will be shipped within 14 days of order, via UPS, and comes with a 30 day money back guarantee and a 120 day warranty. Warranty extensions are available for 1 and 2 year periods.



Fast service and fast shipping are company policies.

Users with large database applications in factory automation, CAD/CAM, accounting, medical, R&D, Point-of-Sale and many other areas are already telling their friends about Emerald. A large percentage of them are in Fortune 500 companies, and many others are on their way to Fortune status.

If your company fits one of those categories, or, if you're a smaller company with an application you thought could only be done on a mainframe or mini, pick up the phone. Call Emerald. An Applications Engineer is standing by to answer your questions, send you literature and refer you to an installed site in your area.

Let one of our customers tell you, first hand, how Emerald helped give his AT Power.



Emerald
Systems Corporation

Mainframe Storage for Micros

4757 Morena Blvd
San Diego, CA 92117
(619) 270-1994
U.S.A.
Telex 353458 EMERSYS
Easylink 62853804



NUMBER SMASHER

Speeds Up Everything...Especially 1-2-3™!

The MicroWay NUMBER SMASHER triples the speed of all CPU bound software while doubling the speed of 8087 bound software. When combined with MicroWay's FASTBREAK™ it results in an increase in the speed of 1-2-3™ of up to 80 to 1! If you're tired of WAITing, the SMASHER is the card for you!

The heart of the NUMBER SMASHER is a 9.54 mhz 8086 working with a matched high speed 8087. The card comes standard with 512K of 16 bit RAM and can be expanded to 640K. It triples the throughput of your original 8088 by doubling the system clock speed and quadrupling the data bus bandwidth.

Software compatibility is guaranteed by the nature of our card. It does not augment the 8088, but replaces it with a special 8086 that runs as a true 16-bit processor in the first 640K of ram and as an 8-bit processor everywhere else.

Examples of software which show dramatic speed-ups include AUTOCAD, 1-2-3™ worksheets which depend heavily on financial or transcendental functions, and multi-user operating systems. Any program written with an MS-DOS compiler that supports the 8087, such as MS-FORTRAN or 87BASIC, will run on the NUMBER SMASHER at least a factor of 2.5 times faster! Software that comes with the card also increases the throughput of I/O bound programs and includes a disk cache routine, ram disk and print spooler.

The NUMBER SMASHER is an upgrade product for 8088 based PCs and compatibles. It works on the IBM-PC and XT, the COMPAQ and compatibles manufactured to the IBM-PC hardware standard. Contact MicroWay or your local MicroWay Installation Center for technical specifications and supporting benchmarks.

**Micro
Way**

The World Leader in 8087 Support

P.O. Box 79, Kingston, Mass. 02364 USA (617) 746-7341

NUMBER SMASHER and FASTBREAK are trademarks of MicroWay, Inc. LOTUS and 1-2-3 are trademarks of Lotus Development Corp.

CIRCLE 159 ON READER SERVICE CARD

Actually, we give you two things free.

Our source code. And your freedom.

Just buy part or all of our excellent integrated business accounting system, the SBT Accounting Software Library.

We'll give you our source code absolutely free.

Which, in turn, gives you the freedom to customize our software to fit your business needs.

Say, for instance, you want to change the way a management report is formatted. Our free source code enables you to change it.

What's more, the change will be quick and simple because our software is written in easy-to-use dBASE.

In fact, the SBT entire Accounting Software Library runs with dBASE III or dBASE II*, so you get the power and flexibility of those best-selling programs. Plus the freedom to use any computer that runs dBASE.

The SBT Accounting Software Library. Great software and freedom. All in the same box.

Call today for our demo disk and free brochure.
(415) 331-9900.

THE SBT ACCOUNTING SOFTWARE LIBRARY.

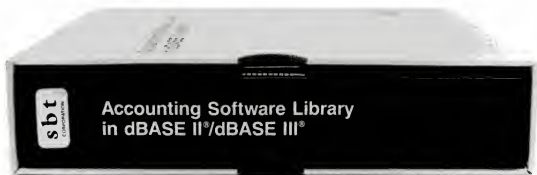
dProfessional	Time & Billing	\$395
dOrder	Sales Order Processing	\$195
dInvoice	Billing/Inventory Control	\$195
dStatement	Accounts Receivable	\$ 95
dPurchase	Purchase Order	\$195
dPayable	Accounts Payable	\$295
dPayroll	Payroll/Labor	\$395
dLedger	General Ledger/Finance	\$395
dAssets	Asset/Depreciation	\$195
dProject	Project/Job Accounting	\$395
dBackup	Menu/Backup	\$ 65



Three Harbor Drive
Sausalito, CA 94965

Call today for the name of the SBT consultant
in your area.

Free source code in every box.



*Compiled versions are also available. dBASE III and dBASE II are registered trademarks of Ashton-Tate, Inc. Copyright 1985, SBT Corporation.

CIRCLE 470 ON READER SERVICE CARD

CROSSMAN™ QUALITY SOFTWARE FOR 'C' & OTHER PROGRAMMERS

C-TREE

B-Tree File Manager, Source Code, No Royalties!

A b-tree can be created with bugs, so before buying one, ask us first. In a word of sayings, that one is a real C-tree. C-tree™ has been around since 1979 (it became Digital Research's Ac-

TEXT TOOLBOX

Tackles Text Tangles

U nix™ boasts a number of muscular utilities that are migrating to the PC world. Lattice has assembled a cluster of the most useful text management tools into a single package.

Group™ looks for text patterns in any number of files. Want all occurrences of a global variable throughout a program? Group™ will search all programs in a directory, down paths to other directories, or all files on a disk? Need to find all the function calls in an entire program system? Group can do it with a powerful expression syntax that goes far beyond your text editor's search command.

Edi™ is similar to the well-known Unix editor. It offers search and replace with group's syntax, block move, read and write optional line numbering append, insert/delete and that unusual feature, a text area to instruct Edi to apply a file of commands to any number of target files even unopened changes. Edi's text additions such as those created by "ed".

Diff™ compares text files line for line. Its output is a precise list of instructions telling what to do to make two files the same or which can be handed to ed to do Code Last Price Our Price

L2200	\$120	\$100
L2205 with Source	\$240	\$200

CVUE

Make Your Own Editor

CVUE is a low-priced screen-oriented C text editor which does most of the things that a good editor should do, and boots full DOS 3.1 directory path name support in reading and writing files.

It was written by the Lattice programmers who felt forgotten by the folks who write WP software. They needed easy entry of non-display characters such as control codes and escape sequences not footnotes, indenting and underlining not status, pattern searching not spell check. So CVUE™ was born.

CVUE only supports in-memory text files, but with memory at today's prices, creating and maintaining files of over 500 K is practical. As compensation, CVUE is very compact and actually runs on computers with only 64 K of memory and uses no tediously slow overlays.

The power of CVUE is its ease of customization. And when you take advantage of the Source Code option, the resultful editor can be made truly your own.

Code	Last Price	Our Price
L2240	\$75	\$69
L2245 with Source	\$200	\$220

NEW FEATURES!

study Manager™). That means reasoned, steady code which hasn't cracked under prolonged and widespread use.

C-tree comes in C source code, revealing all you've ever wanted to know about how b-trees are written. Provided you bend it into your binary application, you can re-distribute it free without royalties. And if all this is disappointing, now the good part: C-tree's design spins nodes to allow any number of users to access an index file simultaneously even when updates are in progress so that multi-user configurations and adaptation to networks are possible.

The latest version has new features: support of variable record length data files, multiple key indexes in a single physical file, MS DOS and Unix record locking examples.

Thanks to source code which does not deviate from K&R, C-tree can travel. Binary has always meant finding a substitute file manager for yet another computer, operating system, or compiler, then changing all the function calls program wide, then starting the whole testing process anew. That's over. Tests in many environments prove that C-tree gives your application a ticket to arrive.

C-tree permits any number of keys for a data file: supports duplicate keys, alphanumeric or numeric etc. etc. is a big product with everything you'd expect. Better that it is intelligently designed as much as a high level set of ISAM routines to minimize your coding by handling all the details of adding a record on its own, for example, and lower level functions which you can access directly. Either way C-tree maintains optimal index structures which will find a record among a million ten byte keys in no more than five disk seeks.

Product Code	F08901	Our Price
Last Price	\$395	\$329

USED COMPILERS

WELCOME

Trade In for the Latest Model Lattice C

Has your compiler run out of gas? Has your model been discontinued? Is a faster behind for lack of new parts?

Even if yours is in good shape, you have surely noticed there are more options and accessories produced to run with the Lattice C Compiler than any other. Don't do without these add-ons any longer. In time for new license plates. Trade in your original disks and manual of any of the compilers below and we'll send you Lattice's most up-to-date model.

From then on you'll be adopted by Lattice for full, direct support by their technical specialists.

Microsoft MS-DOS, PC-DOS C	Price \$190
Compu Innovations C86,	
Mark Williams C,	
Digital Research C,	
Wintech C C	\$200

PRE-C

Thorough "Link"-like Analysis Now on the PC

Unix users angry for a "link" to give programs a thorough cleaning before they disappear into a compiler.

Pre-C™ looks larger than "link" it finds problems your compiler won't. Problems that a debugger will have trouble locating. Even problems which will cause trouble.

30-DAY MONEY-BACK GUARANTEE

We will return the purchase price - of any product in this space if you decide it fails to meet your needs except those coded "C" by requirement of their suppliers. We want you to be completely satisfied with your purchase. Go through the manuals, try out the products and make a thoroughly informed decision whether they are right for you.

The only requirement for refund or credit is that we must receive your returned product within 30 days of its shipment, and it must in our judgment be in 100% resalable condition.

No stamping and handling.

SUPPORT DIRECT FROM LATTICE

Products with codes beginning L are all fresh from Lattice, the premier software developer serving the professional marketplace. PC BRAND has made special arrangements for Lattice to provide telephone support for these products.

Take advantage of this unusual opportunity. Buy from PC BRAND and you get to talk to the experts themselves!

dbc

Switch from dBASE Language to C for Power, Speed

There are a lot of dBASE™ file users out there. Most of them just keep data bases and use dBASE's limited reporting facilities. They're not programmers, so they don't use the dBASE programming language. But they'd like more for their efforts and that's a business opportunity.

dbc™ (links C to dBASE) it creates and maintains files and their indexes which ex-actly replicate dBASE file design. So dBASE can read and update them. And the reverse: dbc can read any files created by dBASE. Now C and dBASE can operate on the same data bases interchangeably.

That opens up the widespread culture of dBASE installations to exploration by C programmers. Now you can replace the resident dBASE language with the speed of C and you no longer have to write

like with other compilers.

Pre-C finds all the syntactical trigwires that will blow out a compiler, sure, but it goes after subtler problems, code which will never be accessed, casts with suspect conversions, variables declared as external but never used, functions never called, obsolete usage (even C has changed), machine-dependent expressions with in-habit probability.

Complete work with one module at a time. They know nothing of other modules which only meet up at link time. Pre-C can look at all segments of your program at once and report to you any inconsistencies of inter-module references, conflicting data type declarations, parameter lists in function calls which disagree with the functions themselves in number or data type, declarations of potential functions which differ from their definition.

Pre-C uses the Unix System II compile standard to safeguard maximum portability anywhere in the C world. There are then plentiful commands to fine-tune. Use Pre-C what to flag and what to forgive, useful during early coding when some functions are empty or incomplete. The output of each analysis can be filed for use with subsequent Pre-C runs so work a not performed redundantly.

Pre-C lets you develop standard profiles of binary libraries. In any C program you subsequently write, Pre-C can use these profiles to make sure your calls to those libraries function are perfect.

That's a big product which will work minutes in speeding large system development. \$28K minimum, \$28K recommended.

Product Code	PC650	Our Price
Last Price	\$985	\$329

every line of code, as in the dBASE language, because now you're unlocked C's vast storehouse of off-the-shelf libraries and utilities.

dbc's functions parallel all dBASE's file handling commands, many of them decomposed to give you closer control. The manual discusses each in detail, and demonstration source files on your disk show how every function is used. Use dbc for custom work for clients or design pre-written programs for manipulation and reporting of dBASE data bases.

Use dbc on its own. It's a complete ISAM file manager for use with the Lattice C compiler whether or not dBASE will ever be used. Lattice has versions for all but memory models and can have sixteen index and data files open at once.

Code & Version	Last Price	Our Price
L2001 DBase II Compatible	\$250	\$225
L2001 with Source Code	\$500	\$450
L2011 DBase III Compatible	\$250	\$225
L2011 with Source Code	\$500	\$450

TERMS AND CONDITIONS OF SALE

Licenses: Each price is for a license to use a product on a single computer and does not constitute ownership. We will require for you availability of multiple machine licenses at a single site. Except for those coded "C", products may be used to create programs for distribution without royalty payments or additional licenses, provided said programs do not substantially replicate the product themselves.

Compatibility: PC BRAND's standard products are designed to operate with the IBM PC, XT or AT. PC-DOS, PC-DOS require no more than 128K of RAM unless indicated. Non-IBM machines using MS-DOS, if in doubt as to total compatibility, please determine from manufacturer.

Refunds: Defective parts will be replaced. Product coded "C" is designed, manufactured and assembled, developed containing details are

opened. Otherwise, to return a product for refund or credit, call (212) 410-4000 for required return authorization.

Payment: All purchases MasterCard Visa, American Express (no charge), wire funds, checks in advance (in NY State add sales tax, and will ship COD in US only for cash on order or certified check (no fee). Purchase orders accepted from larger corporations and institutions at our discretion. Items ship 2nd class.

Shipping & Handling: U.S. UPS Surface 1st product \$6 each add \$3 UPS 2nd Day Air 1st product \$10 each add \$4.50 UPS Next Day Air or Federal Express 1-2 Day Air 1st product \$18 each add \$6. Federal Exp. Next Morning 1st product \$28 each add \$12. International shipping depends on destination and shipping method. \$10 per shipping container for export or customs forms.

To Order Products or Catalog, Call Us at...

800-PC BRAND

That! (800) 722-7263. In NY State or Outside U.S. call (212) 410-4000.

PC BRAND, PO Box 474, New York, N.Y. 10028

TELEX: 667962 (SOFT COMM NYK)

Prices, terms, and specifications subject to change without notice.

© 1985 PC BRAND

CIRCLE 141 ON READER SERVICE CARD

SAVE \$5
Just use our
Free order
card

HOW TO LOAD

PC SYSTEMS

IBM PC	
256K, 2 drive monochrome system	\$2195
256K, 2 drive color system	\$2495
256K, 2 drives & 10MB	\$2695
IBM PC/XT	
256K, 2 drive monochrome system	\$2295
256K, 2 drive color system	\$2595
256K, 2 drives & 10MB	\$2895
IBM PC/AT	
256K, 1.2MB floppy	\$3395
512K, 1.2MB & 350K floppies, 20MB	\$4795
AT&T PC 6300	
256K, 2 drive monochrome system	\$1995
256K, 2 drive color system	\$2495
256K, 1 drive, 10MB, monochrome system	\$2595

These systems are brand new, shipped fully tested and turned in, fully warranted for 90 days AND ARE ALWAYS IN STOCK!

Ask about our full line of system accessories to keep your system up and running indefinitely and trouble free. Choose from games like Kensington Microware, Thoplife and Curtis.

PRINTERS

EPSON	
FX-80+ (160 cps narrow carriage dot matrix)	\$395
FX-105 (160 cps, wide carriage, near LQ dot matrix)	\$525
LX-80 (100 cps, near LQ, select type controls)	\$275
RX-100 (100 cps wide carriage dot matrix)	\$425
JX-80 (160 cps narrow carriage color dot matrix)	\$575
LQ-1550 (LQ dot matrix w/ parallel interface)	\$995
OKIDATA	
ML 192 (NEW 160 cps narrow carriage dot matrix)	\$400
ML 193 (NEW 160 cps wide carriage dot matrix)	\$519
ML 84 (200 cps wide carriage dot matrix)	\$725
PRCEMARK 2410 (350 cps wide carriage dot matrix)	\$1995
CANON	
LBP 5A-1 (Better than HP, Diablo compatible)	\$2795
TOSHIBA	
P-1340 (120 cps narrow carriage LQ dot matrix)	\$595
P-351 (Toshiba's new three-in-one printer)	\$1295
TEXAS INSTRUMENTS	
TI-855 (150 cps narrow carriage LQ dot matrix)	\$699
BROTHER	
HR-15+ (17 cps narrow carriage letter quality)	\$395
HR-25 (23 cps wide carriage letter quality)	\$650
HR-35 (32 cps wide carriage letter quality)	\$895
2024L (New high speed dot matrix)	*
C.I.TOH	
Starwriter (40 cps letter quality)	*
Printmaster (55 cps letter quality)	*
Ask about C.I.TOH's Hot New Line at New Prices!	*
DIABLO	
630 API & ECS	\$1695
NEC	
Printer P-2 & P-3	*
Spewriter 2050, 3550, 8850	*

PRINTER ACCESSORIES

LQ Dot Sheet Feeders for NEC, DIABLO, C.I.TOH	from \$395
Quadram Microcorder Printer Buffer (P/P, P/S, S/P, S/S, BK & up)	from \$135
2 Way & 4 Way Switch Boxes (serial or parallel)	from \$59
IBM Parallel Printer Cable	\$25
Ring King Printer Stands	*
Special Noise Printer Cables	\$35
Rollbars & Printwheels for most printers	*

PLOTTERS

AMDEK	
Amplot II (6 pen Lotus compatible plotter)	\$595
HEWLETT-PACKARD	
HP-7470 & 7475 (2 pen/6 pens)	*
HOUSTON INSTRUMENTS	
OMP 29, 40, 40-2, 41, 42, 51, 52 n stock	*

FLOPPY DISK DRIVES

TANDON TM 100-2 (Double sided/double density 360K)	\$149
CONTROL DATA (Double sided/double density 360K)	\$149
HALF-HEIGHT (PC/XT/AT/PORTABLE compatible double sided/double density)	*
CHOOSE FROM NAMES LIKE SHUGART, TEAC, PANASONIC	from \$119

HARD DISK DRIVES

PEACHTREE PERIPHERALS	
P-20ve (10MB internal/external hard disk with auto boot)	from \$595
P-20ve/AT (20MB internal/external hard disk with auto boot)	from \$795
P-30 AT (30MB internal AT compatible hard disk)	from \$995
10 MB Internal & external removable Winchester systems	*
45 MB tape back-up	\$1695

INTERDYNE	
Microrel tape back-up	\$549

EMERALD SYSTEMS	
PC & AT compatible, up to 280MB, with or without tape back-up	*

SYSGEN	
Quickfile 50MB Streaming Tape Back-Up	*
Image XT cassette tape back-up	\$745
XL (External 20 MB hard disk w/60MB tape back-up)	*

BERNOULLI TECHNOLOGY	
20MB removable media subsystems	\$2595

CIPHER DATA	
XT tape backs up off FDC	\$895

DISKETTES

VERBATIM	
Double sided/Single density	10/324 100/1195
Double sided/Double density	10/329 100/1249
DYSAN	
Double sided/Double density	10/329 100/1249
High-density AT diskettes	10/330
MAXELL	
High-density AT diskettes	10/330

MULTIFUNCTION BOARDS

AST RESEARCH	
Adventure (AT compatible memory expansion with options)	*
Six Pak w/64K (64-384K, serial, parallel, C.C. opt. game)	\$259
MegaPlus w/64K (64-512K*, parallel, C.C. opt. p.s.g.)	from \$259
10 Plus II (Serial, C.C. opt. serial, parallel, game)	from \$135

ORCHID TECHNOLOGY	
Blossom w/64K (64-384K, serial, parallel, C.C. opt. PC Net)	\$259
Orchid PC Turbo (edge & mtrc processor, multitasking to PC)	\$825

QUADRAM	
Quadboard w/64K (64-384K, serial, parallel, game, C.C. bracket)	\$259
QuadMeg (AT memory expansion up to 4MB)	\$349
QuadPort (AT serial and parallel, opt. 4 more serial)	\$125

MICROLOG	
Baby Blue II w/64K (64-256K, Z80, 2 serial, parallel, C.C.)	\$449
Little Red Ram (256K memory expansion)	\$195
TALLTREE J-RAM II & III Multifunction Boards	*

CHIPS

64K (nine chips)	\$19	128K (AT RAM)	*
8087 (coprocessor)	\$125	256K (r & AT boards)	*

OUR POLICY

1. WE ACCEPT VISA, MC, AMEX; No surcharge for VISA or MC.
2. COD requires cash or certified check; Company check when approved.
3. Allow 1 week for personal and company checks to clear.
4. Wiring information available upon request.
5. Corporate, Government and Institutional volume purchase agreements available.

6. Call for exact shipping charges; air shipments take priority.
7. If we must split shipment, you incur no additional shipping charges.
8. All orders shipped insured — No additional charge.
9. All products fully warranted; Some up to 5 years.
10. All items subject to availability; Prices subject to change without notice.

*Call for current price

IBM is a registered trademark of International Business Machines.

UP FOR LESS.

GRAPHICS CARDS

SIGMA DESIGNS	
Color 400 (high res color card for PGS SR-12)	\$549
TSUNG LABS	
UltraPAK (132 col. mono graphics, serial, parallel, C/C)	\$439
UltraPAK, UltraDISK, UltraSERIAL (options for UltraPAK)	*
ColorPAK (Ultra hi res color graphics)	*
PERSYST	
Boe Board (beautifully clear text on a color monitor)	*
HERCULES	
Graphics Card (Lotus compatible monochrome graphics)	\$319
Color Graphics Card (Short-slot color card w/parallel)	\$179
PARADISE	
Modiver Graphics Card & Multi-Display Card	from \$299
AST	
Preview & MonoGraphPlus (Monochrome Lotus graphs, parallel, C/C)	*
STB	
MonoPlus (monochrome w/parallel port)	\$189
Graphics Plus II (Monochrome & color w/parallel, software)	\$299
QUADRAM	
Quadcolor I & II (Upgradable color cards)	from \$189
TECMAR	
Graphics Master (Hi res Lotus compatible color & mono)	*
POLAROID	
Palette (makes color slides from your PC's screen)	\$1395

PROTOCOL CONVERSION

AST RESEARCH	
PCD, 5251, 3780, BSC, SNA (always in stock)	*
DCA	
Ima (3276 Terminal Emulation)	\$895
Imaline, Imalette, Imaprint, Imacom	*
TECHLAND	
Blue Lynx 5251 model 12 & 3276	*
Call our experts for all your Micro-to-Mainframe needs!	

MONITORS

AMDEK	
300G & 300A (Green or Amber, composite video monitors)	\$129-\$139
310A (Amber TTL input, non-glare tube)	\$189
COLOR 800 (13" 640 X 240 RGB w/text button, audio)	\$425
COLOR 700 (13" 720 X 480 RGB w/.31mm dot)	\$475
COLOR 710 (13" 720 X 480 RGB, non-glare, non-flicker)	\$575
QUADRAM	
Amberchrome (Amber TTL input, non-glare tube)	*
Quadchrome HX-12 (690 X 480 RGB w/.31mm dot)	*
PRINCETON GRAPHICS	
PGS MAX-12 (Amber TTL input, non-glare tube)	\$189
PGS HX-12 (690 X 480 RGB w/.31mm dot)	\$449
PGS SR-12 (690 X 480 non-interlaced RGB w/.31mm dot)	*
TAXAN	
RGBvision 425 & 440	*

MODEMS

HAYES	
Hayes Smartmodem 300 (external 300 baud, auto answer/dial)	\$199
Hayes Smartmodem 1200 (external 300/1200, auto answer/dial)	\$419
Hayes Smartmodem 1200B (internal 300/1200, w/Smartcom II)	\$379
Hayes Smartmodem 2400 (external 2400 baud)	\$675
ANCHOR AUTOMATION	
Signalman Mark XII (300/1200 baud at 300 baud price)	\$259
AST	
Resch (Short-slot 300/1200 baud w/CROSSSTALK, self-test)	\$360
POPCOM (internal & external)	*
RIXON 300/1200, 2400, and 4800 baud modems	*

NETWORKING

We carry all the best names including AST RESEARCH and ORCHIO TECHNOLOGIES. Call our Networkers Applications experts to design a cost-effective device-sharing networked layout for your office!

SOFTWARE

INTEGRATED AND RELATED PACKAGES	
ENABLE/Reviewed as "the Package Symphony should have been!"	*
ASHTON-TATE Framework	\$369
LOTUS Symphony	\$429
SOFTWARE PUBLISHING Pkg Write, File, Graph, Report	from \$79
WORD PROCESSING	
SAMNA WORD III & PLUS	*
MULTIMATE comes w/spelling checker and tutorial	\$249
MICROPRO WordStar 2000 & 2000 plus	\$245/\$295
MICROSOFT Word Version 2.0	*
LIFETREX VoiceWriter Deluxe w/Readmerge	\$169
WORDPERFECT 4.0	\$259
LEADING EDGE Word Processor	\$85
SPREADSHEETS	
LOTUS 1-2-3	\$399
SORCIMIUS Supercalc 3	*
SORCIMIUS Multitool w/multitools	\$139
DATABASE MANAGERS	
ASHTON-TATE dBase II & III	\$295/\$375
MICROIM RBase 5000	\$389
GMS SYSTEMS Power-base	\$259
DATAFILE (free-form database with opt Report)!	*
CIP Concise Information Processor	*
MICROSTUF Introscope	*
LEADING EDGE Nutshell	\$95
COMMUNICATIONS PACKAGES	
MICROSTUF Crosstalk XVI	*
PERISoft Smart term 100, 125, 400	\$95
HAYES SmartCom II	\$95
SOURCE The Source	*
DOW JONES All products	*
ACCOUNTING PACKAGES	
STATE OF THE ART (S/L, A/R, A/P, Inv, Others)	*
SORCIMIUS Complete accounting modules	from \$289
BPI ACCOUNTING Complete accounting modules	*
REAL WORLD Accounting	*
OPEN SYSTEMS Accounting	*
MONDRM Dollars and Sense w/Forecasting	\$139
GRAPHICS AND CAD PACKAGES	
DECISION RESOURCES Signmaster/Chartmaster	\$179/\$249
BPS Business Graphics	\$299
AUTODESK AutoCAD with or without extensions	*
IMSI PC Paint Brush	\$95
PLANNING PACKAGES	
MECA/TOSIAS Managing Your Money	\$129
HARVARD Total Project Manager	*
MICROSOFT Project	*
LANGUAGES & COMPILERS	
BORLAND Turbo Pascal & TurboC	\$39
MICROSOFT All products	*
ORIGITAL RESEARCH All products	*
WORDTECH dBASE COMPILER	*
LIFEBAT Lattice C compiler and C-load Smorgesberg	\$295/*
UTILITY PROGRAMS	
BORLAND Sidekick & Superkey	\$39
PRINTWORKS by Softbyte	*
NORTON Utilities (by Peter Norton)	\$59
QUAD Copywrite, Disk Explorer & Zero Disk	*
CENTRAL POINT Copy II PC copies protected software	\$35
ATI Training (for many popular packages)	\$55

Call for quantity pricing!

FOR ORDERS ONLY

1-800-446-7995

FURTHER INFORMATION	1-404-446-7995
CUSTOMER SERVICE	1-404-446-7995
TECHNICAL SUPPORT	1-404-446-7995

HRS: 9AM - 9PM EST, SAT 12N - 5PM EST

PROGRESSIVE MICRO DISTRIBUTORS

7000 Peachtree Industrial Boulevard
Norcross, Georgia 30071
CIRCLE 366 ON READER SERVICE CARD

"Symphony 1.1 now makes translating data from and to other programs push-button simple. It is the first program I've seen that is actually fun to install."

*Bob Harris, Deputy Assistant Director for Budget Analysis
Congressional Budget Office.*

"I'm thoroughly impressed by Symphony 1.1 and glad to have it. You're going to have to use dynamite to get it out of my machine. It's almost my whole wish list in one."

*Dwight Alene, Assistant V.P., Internal Reporting
American Medical Int'l, Beverly Hills, CA*

"In our work in financial planning and analysis we have found that Symphony 1.1 does two things. First, it allows us to build spreadsheets which are a little bit bigger than would otherwise fit in the computer...Second, in doing a spreadsheet layout design, we now have greater flexibility because of the new memory allocation."

*Ron Diderich, Manager, Financial Planning and Analysis Consulting
Ernst & Young, Cleveland, OH*

LOTUS PRESENTS SYMPHONY 1.1

It was a sneak preview.

We gave advance copies of Symphony™ release 1.1—the new version of the popular five-function PC software—to some of the most sophisticated software experts. The reaction was overwhelmingly enthusiastic. Here's why:

1. **NEW EXPANDED MEMORY.** Symphony release 1.1 works with the new expanded memory boards to provide a solution to the "big data" issue, allowing users to store formulas, labels, and floating point numbers in up to 4MB RAM.
2. **NEW MEMORY ALLOCATION SCHEME.** The new

sparse matrix scheme provides greater flexibility and eliminates the need to arrange worksheets to conserve memory.

3. **MACRO LIBRARY MANAGER.** This permits the creation of libraries of macros that can be accessed from any worksheet and allows the development of multiple worksheet applications.

4. **8087/80287 SUPPORT.** Symphony release 1.1 can take advantage of 8087/80287 math co-processor chips, increasing calculation speed by up to 60 times.

5. **1-2-3 COMPATIBILITY.** New Symphony supports file translations between Symphony, 1-2-3® release 1A and

"With Symphony 1.1, Lotus has again set the industry standards so high that they'll force the rest of the industry to shoot for the same."

*R. L. Martin, Manager Decision Support Systems
Enron Corporation, Cleveland, OH*

"I am very excited about the memory feature. It's a breakthrough for Symphony in that it significantly broadens the universe of Symphony users."

*Robert Schlitzel, V.P., Computer Systems (Corporate Finance)
Bankers Trust Co., New York, NY*

"The Macro Library function is great. Symphony's strength lies in its command language."

*Sally Nager, Senior Information Systems Analyst
Aetna Electrosystems Co., Azusa, CA*

THE TOUGHEST CRITICS RAVE.

Jazz." This fall, Symphony and a new version of 1-2-3 will have compatible spreadsheets, allowing the sharing of data files with no need for translation.

The critics have already acclaimed the programming potential found in Symphony's Command Language—with its conditional statements, branching and parameter passing—the Lotus® File Format and Add-In Tools. And they've praised Symphony Link™—the micro-to-mainframe Add-In. All of which makes Symphony one of the most powerful PC application development tools around.

And now Symphony is easier to learn, with a new install program and new documentation.

For your own private performance, visit your authorized Lotus dealer today.

If you already own Symphony, call 1-800-TRADE UP (in Canada 1-800-447-4700) and we'll tell you how to get your upgrade kit.



Symphony™
Lotus®

MICROWAY'S 8087 RUNS 1-2-3™!

MicroWay is the world's leading retailer of 8087s and high performance PC upgrades. We stock a complete selection of 8087s that run at 5 and 8mhz. All of our coprocessors are shipped with a diagnostic disk and the best warranty in the business - one year! We also offer daughterboards for socketless computers such as the NEC PC and PCjr, and a board which increases the clock speed of the 80287 from 4 to 8 mhz. Our NUMBER SMASHER™ includes 512K ram. It will run the IBM PC at clock speeds up to 10mhz and achieves a throughput of 1 megaflops

with 87BASIC/INLINE, Intel Fortran, or Microsoft Fortran. Software reviewers consistently cite MicroWay software as the best in the industry! Our customers frequently write to thank us for recommending the correct software and hardware to meet their specific needs. They also thank us for our same day shipping! In addition to our own products which support the 8087 and 80287, we stock the largest supply of specialized software available anywhere. For information call us at

617-746-7341

FASTBREAK™ . . . MicroWay's software turns on your 8087 during 1-2-3™ execution. Recalculations run up to 38 times faster. When used with the NUMBER SMASHER™ it can provide a total increase in 1-2-3™ execution speed of up to 79 to 1. FASTBREAK provides you with the unique capability for running other programs on top of 1-2-3. These programs can be written in BASIC, PASCAL, Fortran or C and can access the current values in your 1-2-3 worksheet. **\$79**
FASTBREAK & NUMBER SMASHER **\$1599**



NUMBER SMASHER™ The World's Fastest Accelerator Card for the IBM PC, XT, and Compatibles! Includes an 8088 and 8087 pair tested to 10mhz, and 512K bytes of high speed ram. Compatible with all software, operating systems and hardware! Your program speed is increased by a factor of 2.5 to 4.0. Floating point programs run up to 2.8 times faster on the PC than on an 80287 equipped PC AT. **\$1590**

MATRIXPAK™ manages a MEGABYTE! Written in assembly language, our runtime package accurately manipulates large matrices at very fast speeds. Includes matrix inversion and the solution of simultaneous linear equations. Callable from MS Fortran 3.3, 87MACRO, and 87BASIC/INLINE. each **\$150**

87FFT™ Written in assembly language, performs Forward and Inverse FFTs on real and complex arrays which occupy up to 512K bytes of RAM. Also does convolutions, auto correlations, hamming, complex vector multiplication, and complex to radial conversions. Callable from MS Fortran, 87MACRO, C, TURBO PASCAL or 87BASIC/INLINE. **\$200**

87FFT-2™ performs two-dimensional FFTs. Ideal for image processing. Requires 87FFT 1000

GRAPHICS PACKAGES
 Grafmatic for MS Fortran or Pascal. **\$125**
 Plotmatic for Grafmatic. **\$125**
 Multiplot (one language) **\$189**

DFixer™ - Eliminates the AT hard disk problem! A disk which thoroughly checks PC or AT hard disks for bad sectors and updates the MS DOS file allocation table accordingly. **\$149**

87DEBUG™ - a professional debugger with 8087 support, a sophisticated screen-oriented macro command processor, and trace features which include the ability to skip tracing through branches to calls and software and hardware interrupts. Breakpoints can be set in code or on guarded addresses in RAM. **\$150**

87BASIC/INLINE™ converts the output of the IBM Basic Compiler into optimized 8087 inline code which executes up to seven times faster than 87BASIC. Supports separately compiled inline subroutines which are located in their own segments and can contain up to 64K bytes of code. This allows programs greater than 128K! Requires the IBM Basic Compiler and Macro Assembler. Includes 87BASIC. **\$200**

87BASIC™ Includes patches to the IBM Basic Compiler and both runtime libraries for USER TRANSPARENT 8087 support. Provides super fast performance for all numeric operations including trigonometric, transcendental, addition, subtraction, multiplication, and division. **\$150**

87MACRO™ - our complete 8087 software development package. It contains an object library of numeric functions including transcendental, trigonometric, hyperbolic, encoding, decoding and conversions which take full advantage of the 8087's capabilities. 87MACRO will save you many years in development time! For the IBM or MS Macro Assembler, Version 1.0, 2.0, or 3.0. **\$150**

OBJ-ASM™ - a multipass object module translator and assembler. Produces assembly language listings which include public symbols, external symbols, and labels commented with cross references. Ideal for understanding and patching object modules and libraries for which source is not available. **\$200**

RTOS - REAL TIME OPERATING SYSTEM
 RTOS is a multi-user, multi-tasking real time operating system. It includes a configured version of Intel's RMX-86, LINK-86, LOC-86, LIB-86, OH-86, and MicroWay's 87DEBUG. Runs on the IBM PC, XT, PC-AT and COMPAQ. **\$400**

INTEL COMPILERS¹
 FORTRAN-86. **\$750**
 PASCAL-86. **\$750**
 PL/M-86. **\$500**
 ASM-86. **\$200**
¹Requires RTOS or RMX-86. All Intel compiler names and RMX-86 TM Intel Corp.

8087 5mhz. \$109
 Including DIAGNOSTICS and one-year warranty
 For IBM PC and compatibles.

8087-3 5mhz. \$175
 For the Tandy 1200.

8087-2 8mhz. \$175
 For Wang, AT&T, DeskPro, NEC, Leading Edge.

80287-3 5mhz. \$199
 For the IBM PC AT and Compaq DeskPro 286.

287Turbo™ 8 mhz. \$395
 With Reset Button.

64K RAM Set. \$7

256K RAM Set. \$49

256K CMOS RAM Set. \$49

128K RAM Set PC AT. \$150

AST Advantage. \$439

JRAM-2™ (0K). \$169

JRAM™ AT (0K). \$229

MAYNSTREAM™ 80 meg. \$1095

FORTRAN, C and BASIC

Microsoft Fortran Version 3.3. **\$229**

IBM Professional Fortran. **\$455**

Ryan-McFarland Fortran. **\$399**

FORLIB+ or STRINGS and THINGS. **\$5**

Lattice C or Microsoft C Version 3.0. **\$299**

C88. **\$279**

FLC1AT87. **\$150**

IBM Basic Compiler Version 2.0. **\$445**

Microsoft Quick Basic. **\$99**

Summit BetterBASIC. **\$175**

Summit 8087 Module. **\$7**

True Basic. **\$105**

PCASO ASSEMBLERS

IBM Assembler with Librarian V. 2.0. **\$55**

Microsoft Assembler Version 3.01. **\$125**

PASCAL and APL

Microsoft Pascal Version 3.3. **\$199**

Borland Turbo with 8087 Support. **\$5**

STSC APL+PLUS/PC. **\$50**

Rockwell APL. **\$5**

COSMOS Revelation. **\$750**

SPSS/PC. **\$595**

FASTBREAK and NUMBER SMASHER are trademarks of MicroWay, Inc. Lotus and 1-2-3 are trademarks of Lotus Development Corp.

MicroWay

P.O. Box 79
 Kingston, Mass.
 02364 USA
 (617) 746-7341

**The World Leader
 in 8087 Support!**

NETWORK NEWS

Vol. 1, No. 1

A GUIDE TO THE PROMISED LAN®

Oct, 1, 1985

PROLAN's High Speed Token Passing Network Startles LAN Market

PROLAN 2.0 Offers Professional Features for only \$795⁰⁰!

Local Area Networking. If your business runs on PC's, it's the key to greater profits. With a LAN, you can share hard disks, printers, plotters, and modems. With central databases, vital information is at everyone's fingertips quickly. You can run multiuser software, like accounting systems, with transactions and reporting from one or many workstations. you can even access a mainframe

without expensive communications boards for every PC. To do all this and more you need a fast, full featured, professional LAN.

If you're serious about improving the throughput of your business, PROLAN has the answer for you. A quick, dependable LAN with a proven track record in small and large installations the world over.

You can't afford to compromise on speed, reliability, or thoroughness in your business. Don't compromise on your LAN.

PROLAN Features fulfill the Promise of PC networking!

- Token Passing Protocol
- Bus, Logical Ring Topology
- Baseband RG62 Coax or Fibre Optic Cable
- Up to 255 nodes served per network
- Transmission rate 2.5 megabits per second
- Supports IBM, AT&T, COMPAQ and most compatibles
- Supports IBM PC DOS 2.0, 2.1 and 3.0
- Password protection: 3 types, 2 levels
- Print Service performed in background
- Up to 64 named parallel/serial devices
- File Service performed in background
- Disk and memory caching
- Hierarchical volume directories
- Record and file locking utilities
- Electronic Mail Included
- Supports IBM XT and AT internal drives
- Optional hard disks from 10MB-900MB
- Optional 3270 Gateway
- Optional Asynchronous Server
- Optional Multiuser Software



\$1195⁰⁰ Electronic Mail Included FREE!

Electronic Mail. It makes your PC network into a powerful communications system. Whether you need to send a message across the office or around the world. That's why PROLAN includes the famous LAN: MAIL MONITOR® free with every network sold. Because you shouldn't settle for anything less.



Davong Systems Upgrade for \$395⁰⁰!

Token Passing Networks are the only answer to speed and reliability in your PC environment. But not all are created equal. That's why PROLAN offers upgrades at special savings for Davong systems owners. PROLAN 2.0 will run your existing hardware and multiuser software applications! Upgrade now and expand with PROLAN!

PROLAN Corporation
3100 Wesleyan, Suite 230, Houston, TX 77027
Telephone: (713) 877-1155
Dealer Inquiries Invited

PROLAN®
Professional Local Area Networks

CIRCLE 139 ON READER SERVICE CARD

See what EnerConnect can do with mainframe graphics on your PC.



EnerConnect® is the first software package that puts mainframe graphics capability into the hands of anyone with an IBM PC/XT/AT or 3270 PC.

Now a PC user can have desktop access to business and technical graphics applications generated by GDDM, ISSCO's Tell-A-Graf® and DISSPLA®, SAS/GRAPH® and IGES datafiles.

Once they're displayed, EnerConnect lets you manipulate them in a variety of ways. You can rotate, enlarge, reduce, cut-and-paste with other elements from different mainframe files, add text and even direct output on low-cost PC

printers and plotters. All without using expensive mainframe connect and processing time.

You can also use our PC-based graphics program, EnerGraphics, to interface with spreadsheet data from LOTUS 1-2-3, VISICALC and other packages, turn the data into easy-to-understand bar charts and then combine them with mainframe graphics.

EnerConnect. Your Mainframe-to-PC software link. Developed by the specialists in graphics applications software.

Call or write for our free brochure and see what EnerConnect can do for you.

ENERTRONICS SEEING IS BELIEVING

Enertronics Research, Inc. • 150 N. Meramec • Suite 207 • St. Louis, MO 63105 • (314) 725-5566 • 1-800-325-0174

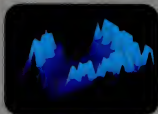
CIRCLE 133 ON READER SERVICE CARD

CHECK-OUT ENERGRAPHICS™

YOUR TOTAL GRAPHICS SOFTWARE



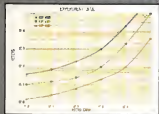
Presentation Business Graphics
EnerGraphics delivers pie charts, flowcharts, bar charts, line graphs and more with easy interface to Lotus 1-2-3, MultiPlan and other spread sheets. You'll learn it quickly because we're menu-driven.



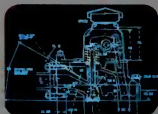
3-D Object & Surface Drawings
EnerGraphics gives you entry-level 3-D CAD features such as zoom, rotate and hidden line removal.



Drawing Capability With EnerGraphics, simple keystroke commands enable you to create text, flow, gantt, PERT and organization charts with the capability to enlarge, reduce, rotate, draw, modify, duplicate and overlay.



Statistics EnerGraphics enables you to analyze data using linear and log scales to do linear and polynomial regression. Statistical information can be represented in scatter graphs.



Mainframe Link Our new EnerConnect program allows you to combine PC-based graphics with mainframe graphics such as GDDM, ISSCO'S Tel-A-Graf®, Dissple® and IGES data files.



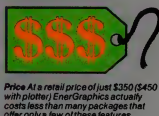
PC Compatibility EnerGraphics can give you an unlimited number of graphics applications on Wang, TI, IBM PC/XT/AT, 3270/PC and compatibles.



Slide Show Any of our attractive graphics can be converted into color or b&w slides, or overhead or on-screen presentations using the Polaroid Palette.



Corporate Use You'll find EnerGraphics is the graphics software choice of over 100 leading corporations with more being added all of the time.



Price At a retail price of just \$350 (\$450 with plotter) EnerGraphics actually costs less than many packages that offer only a few of these features.

EnerGraphics. Brought to you by the specialists in graphics application software.

Find out why users rate us at the top among stand alone business graphic packages. Just check with your local EnerGraphics dealer today.

CIRCLE 134 ON READER SERVICE CARD

ENERTRONICS

SEEING IS BELIEVING

WordPerfect 4.0. Our highest marks yet.

WORD PERFECT		Poor	Fair	Good	Excellent
Performance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Documentation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ease of Use	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Error Handling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Support	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

A perfect report card. It wasn't necessarily our goal when we added the most recent enhancements to WordPerfect. We were more interested in responding to the suggestions of our users and dealers.

But a perfect report card is like icing on the cake. And it makes us more confident than ever that WordPerfect 4.0 is the most perfect WordPerfect, yet.

Easier.

Most WordPerfect 4.0 functions require only one keystroke, a simple press of a finger. And new comprehensive documentation makes learning a breeze.

Faster.

Document orientation means WordPerfect 4.0 never makes you

wait between pages. No matter how fast you type, WordPerfect won't slow you down.

Better.

WordPerfect 4.0 includes several features not found on many word processors. Like a 100,000-word phonetic dictionary; multi-page footnoting capability; table of contents and index generation; automatic outlining and para-

graph numbering; and a 4.0 network version. Get the word processor that lives up to its name (and its report card): WordPerfect 4.0. For more

information, see your dealer. Or call or write:

new version lives up to its perfect billing

InfoWorld

SSI Software
288 West Center Street
Orem, Utah 84057
Information: (801) 227-4020
Order Desk: 1-800-321-4566,
Toll-free



SSI Software
Reaching for perfection.

WordPerfect 4.0 represents a new standard of excellence

InfoWorld

WordPerfect 4.0. For more

News

News in Brief	37
Communiqués	46
PC Update	52
Downtime	56

Wang Plays A Strong PC-Compatible Hand

BY JAMES LANGDELL

LOWELL, Mass.—Wang Laboratories has put its answer to IBM's PC AT on the desktop and played its strongest suit, word processing, in the form of a software package for the IBM PC that emulates a dedicated Wang word processor.

Wang announced the immediate availability of the Advanced Professional Computer, an 80286-based desktop machine that Wang claims is even faster than the AT. Wang Word Processing for the IBM PC, the software package, will be available in October at a price of \$695. Wang will also offer components to achieve closer links between IBM PCs and its own VS minicomputers through

remote or local office connections.

"We've introduced these products because our major accounts have wanted to tie things together," said John Thibault, vice president of Wang systems product management. He said many companies use Wang word processing systems in the secretarial and clerical areas, while IBM PCs have turned up on the desks of managers and executives. In these situations, Wang's new offerings, he says, will "allow the same document format to be standardized throughout a company."

Wang also hopes that corporations will be motivated to preserve this standardization and turn to Wang's larger office-automation systems when they



Wang's Advanced Professional Computer uses a faster 80286 chip than IBM's AT.

expand. This strategy could be the key to Wang's recovery from its current slump; the company has suffered financial losses and made massive em-

ployee layoffs.

At the same time, Wang's move into the IBM PC market could affect Multimate International, the Hartford, Conn., maker of the leading Wang-emulating word processing software for the IBM PC. (See "Software Giants to Join Hands in Business Bliss.")

To make the IBM-to-Wang transition even easier, Wang supplies, as a standard part of its menu-directed word processing package, a replacement keyboard with the same key arrangement used consistently through the entire Wang computer product line. On the keyboard's top row, 16 function keys are labeled clearly for specific word processing actions. This keyboard can also be used for any standard IBM PC operations, as some keys have a second blue legend to account for IBM-specific keys that aren't

MicroPro Makes WordStar Easy for Novice Users

BY DARA PEARLMAN

SAN RAFAEL, Calif.—MicroPro, the manufacturer of WordStar, has released a versatile word processing package aimed at computer novices and people who do not wish to master the upper-end program's complicated commands or pay its price.

Titled *Easy*, the new package is poised to grab the market share held by PFS:WRITE and

IBM's *Writing Assistant*. MicroPro CEO Glen Haney says that *Easy* is better than PFS:WRITE for four reasons: an undelete command, an unlimited document size, support of 120 printers, and screen space up to 240 columns. In addition, Haney says that *Easy* "offers more features and newer technology" than the PFS program, citing the program's pop-up windows and visual interface.

MicroPro's strategy for *Easy* is to appeal to people who are computer novices and introduce them into the WordStar family. Since the two programs use compatible file formats, *Easy* users should naturally upgrade to WordStar.

"File compatibility is the most significant factor when you go after someone else's product base," says Haney. "A key point of strategy is to target

(continued on next page)

(continued on next page)

Wang's Hand

(continued from preceding page)
used in Wang's system.

The Advanced Professional Computer (APC), like the AT, can serve a single user under MS-DOS or can drive several workstations under a form of UNIX. The APC can serve a total of four users as opposed to the AT's three. Wang also claims its APC performs most benchmark tests at about twice the AT's speed.

The greater speed is largely because the Wang uses an 80286 processor capable of 8-MHz processing as opposed to the AT's 6 MHz. The APC also gets a boost by using no wait state in memory access, while the AT uses one wait state in each cycle. Memory operations are further streamlined by the APC's ability to hold up to 2 megabytes of RAM chips on its system board, which can be accessed faster than memory chips on a board plugged into the system's bus. Wang's proprietary SIMM (single in-line memory module) packaging permits the chips to be installed at that density.

Until recently, Wang made no efforts to make its systems PC compatible, although its desktop computers were built around chips from the same family as those used by IBM. However, Wang's does use a menu-surrounded version of MS-DOS as the machines' operating system.

The current models of Wang's APC and the existing Professional Computer still are not directly PC compatible, mainly because of different graphics systems. Wang, however, now offers IBM emulation display boards that permit its PC and APC to run PC-compatible software on monochrome or color/graphics monitors. The IBM emulation boards are priced at \$595 for monochrome characters and \$575 for color. (The monochrome emulation board will also work with Wang-specific software, but the color emulation board will only work with IBM software.) Another monochrome board priced at \$655, the Character/Graphic/IBM emulation (CGI) card, will produce Wang mono-

MicroPro's Easy

(continued from preceding page)

the first-time user." The package comes with four disks—for the program, dictionary, tutor, and installation—that are not copy protected. A slim, 95-page, unimposing manual is also included.

Micro Prose

"Naive users" were involved early in the product development cycle, and, accord-

ing to product manager Lewis Levin, "obviousness was more important than saving key strokes. With little explanation, a user can figure out what to do just by trying things. We don't assume anything."

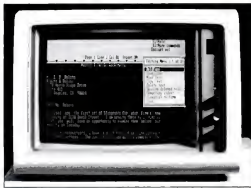
Easy, one of the first commercial packages written in Modula-2, has an automatic paragraph reformat function—something *WordStar* doesn't

have. Hancy, however, says that "there's nothing in *Easy* that a regular *WordStar* user would look at and say 'wow.'"

MicroPro will engineer a 21-city "road show" on *Easy*'s behalf this fall, designed to sell the program to dealers. Despite its low price and narrow profit margin, MicroPro reports an initially positive response from dealers. It is pushing *Easy* as a product that doesn't need much support, while hoping that the *WordStar* connection will give the product some credibility.

MicroPro feels that *Easy* will neither undercut *WordStar* sales nor tempt away those who would be disposed to buy the more expensive program. Rather, it is designed to bring computer uninitiates into the word processing fold. This induction, ultimately, will help sell computers.

Hancy says that part of the problem behind the current industry slump is that technically able people have been satisfied. *Easy*, then, is meant to help bring in people who are still "waiting in the wings." ■



Priced at \$150, *Easy* requires 256K, DOS 2.0, and uses pop-up editing windows.

chrome graphics as well as the IBM and Wang characters. The standard Wang display boards are \$275 for monochrome and \$400 for color.

APC or Not APC?

The Wang APC is available in either a 5-slot or 8-slot chassis (base models are \$3,465 and \$3,900 respectively). A model with 8 slots, 512K bytes of RAM, a 1.2-megabyte floppy disk drive, and a 20-megabyte hard disk (the XAPC-S2) is priced at \$5,495; with a 67-megabyte hard disk, (the XAPC-S3) the price is \$8,895. An XAPC-S2 filled out with Wang's optional monochrome monitor (\$275), monochrome display card (\$250), and 360K-byte floppy disk drive (\$425) costs a total of \$6,445, while an equivalent PC AT with all-IBM equipment would total \$6,810.

Owners of Wang's earlier Professional Computer can upgrade that machine to APC standards with a \$2,000 kit that enables the user to replace the computer's system board.

As for linking-product offerings, the Wang Remote Office Connection (\$1,200) enables an IBM PC or XT to act like a Wang 2256C workstation when it communicates with a Wang VS minicomputer through a modem. The package includes a communications card that can work at rates of up to 9600 baud as well as a copy of the Wang word processing software and a keyboard. When linked to a remote Wang VS, the IBM PC can transfer files or log onto the VS to run its networked applications software, *Wang OFFICE*, which handles electronic mail, time management (calendar), personnel directories, and file management.

Running for the Office

The Wang Local Office Connection (\$1,895) is similar to the remote version, but uses a dual-coaxial cable to link an IBM PC or XT to a VS host up to 2,000 feet away. This link allows the two computers to communicate at rates up to 4 megabits per second—fast enough to

allow the PC to use the VS's software with the same facility as its own standalone programs. Wang's software offerings for this VS network include *Wang OFFICE*, *WP Plus* (its most advanced word processor), a relational database that can be manipulated with Wang's *Professional Application Creation Environment (PACE)*, and a spreadsheet called 20/20 (which will be available this winter).

Wang claims that the connection allows a PC user to bounce between the VS mode and a standalone DOS mode, using *PACE* to extract data from a central database, then analyzing it within a 1-2-3 spreadsheet, for example.

Wang, in another move to even its odds against IBM in the PC market, will make public all data about the Professional Computer's and APC's architecture. The open-architecture packages for developers include technical reference manuals and diskettes with complete listings of the BIOS code used in Wang's computers. ■

Software Giants to Join Hands in Business Bliss

Insiders
have high hopes
for the
"Ashton-Mate"
marriage.

BY CHARLES BERMANT

CULVER CITY, Calif.—Software publisher Ashton-Tate will pay \$19 million for word processing pioneer Multimate International, thus joining two of the personal computer industry's most successful companies and creating what all concerned hope will be a software giant.

"With both companies there is a tremendous amount of synergy," says Multimate president Wilton Jones. "We're addressing the same problems; Ashton-Tate's style is a lot like ours."

The companies had been considering the merger for months, but only a few weeks after serious talks began, the purchase was publicly announced.

Tying the Knot

When the deal is closed, probably by the end of the year, Multimate International will become a wholly owned subsidiary of Ashton-Tate and will continue its foray into the mainframe software environment. Ashton-Tate, which has its own mainframe plans, will opt for a "hands off" approach to running its new division, which is located across the country in Hartford, Conn.

Overlapping functions like sales and marketing, however, will eventually merge. Jones says Ashton-Tate has diverse European market connections, while Multimate has strengths in direct sales. Joint products are planned, possibly a tighter



Multimate president Wilton Jones

integration between word processing and database systems, but these programs will not appear until the end of 1986.

"This is a marriage made in heaven," says Ashton-Tate president Ed Esber. "It will allow Will (Jones) to better do what he wants to do and not be hindered with other things."

Says Jones, "This is like going public without people looking over your shoulder. There will be no major management changes."

Esber says that Ashton-Tate is still looking to purchase companies, but adds that "my board will make the hurdle higher for any new acquisition until this transaction is completed. But there is a considerable number of innovative products coming out of small entrepreneurial organizations, and I expect we will leverage marketing and sales through complementary products. It's not like adding shoes. We want to supply the technology and expertise that customers need."

Multimate, which emulates the Wang dedicated word processor, has recently faced stiff competition from both IBM and Wang, which just introduced its own PC word processing package. Jones denied that Wang's PC entry had anything to do with the sale, while Esber says, "If we ran our company by responding to our competition, we might as well retire. Competition is a way of life."

IBM PC Creator Dies

BY VIRGINIA DUDEK

DALLAS—Philip D. "Don" Estridge, 47, IBM vice president of manufacturing and former head of the Entry Systems Division, which developed the IBM PC, was among the six IBM employees killed in the August 2 Delta Air Lines crash at the Dallas/Fort Worth airport. Estridge's wife, Mary Ann, also died in the crash.

The other IBM employees killed in the crash were marketing representatives Kim Neel, Sabrina Polk, and Deborah Wight, and marketing manager Milt Shoecraft from IBM's Los Angeles office; Boca Raton staff engineer Moses Barnes; IBM summer college interns Darlene Brown from the University of Illinois (Champaign) and Zohniffer Gilliard from Purdue University. In addition, five other IBM employee rela-

tives lost their lives: Joanne Barnes, Kara Barnes, Vicki Shearer, Evan Thompson, and Julie Zarnt.

Most of the IBM employees were returning home after business trips to IBM's headquarters in Boca Raton, Fla.

Friends and colleagues expressed sorrow at the death of the man often thought of as the creator of the PC.

"Don Estridge was a man of vision whose skill and leadership helped guide IBM's personal computer business to success," said John F. Akers, president and CEO of IBM. "He had a very bright future in our business. He and Mary Ann will be greatly missed."

A 25-year veteran of IBM, Estridge began his role in the development of IBM's personal computer line in 1980 when he was appointed manager of what was then called the Entry Level

Systems-Small Systems group. In this capacity he led a small, select group of IBM engineers and marketing people in the development of the corporation's first microcomputer. In an entrepreneurial style atypical of IBM, the division produced a PC prototype within 4 months. By 1983, PC sales were outpacing the then-best-selling Apple II computer, and gross sales of the IBM PC have reached close to \$4.5 billion per year.

Estridge and his Boca Raton team was also responsible for the division's other PC products, which included the PC XT, the recently discontinued PCjr, the Portable PC, and the PC AT. In March of 1985, Estridge was transferred from his position in the Entry Systems Division to oversee IBM's worldwide manufacturing plans and objectives.

"Don was a very unique individual," said Bill Gates, chairman of Microsoft Corporation in Bellevue, Wash. "He under-



Philip D. Estridge

stood how to get the benefits of IBM's strengths. When people say he was the father of the IBM PC, it's no exaggeration."

The Estridges lived in New Canaan, Conn., and are survived by four daughters and three grandchildren.

FORMS

a simple task, a powerful tool...

**"INTENSELY
PRACTICAL!"**
— Esther Dyson, Publisher
Computer Industry Daily



Simply put, data gathering is a fundamental part of business.

Simply put, there has yet to exist an effective way of producing and managing forms.

Simply put, FormTool is the solution.

FormTool™

Software to create, edit and customize any type of forms for use in your business.

\$75

Requirements: IBM PC/XT/AT or 100% compatible.
256K RAM. IBM compatible dot matrix printer.

FormTool is a trademark of BLOC development corporation.
IBM is a registered trademark of International Business Machines Corporation

BLOC development corporation

1301 Dade Boulevard
Miami Beach, Florida 33139

To order call toll free:



National

1-800-231-1149



In Florida

1-800-624-2063

Send me _____ copies of FormTool.
Enclosed is my check or money order for \$_____.
(Florida residents add 5% sales tax)

On-Screen Training . . . Sony has introduced a new MS-DOS-compatible computer, the SMC-2000, as part of its new line of Sony View interactive video systems. This 80186-based machine was designed to work in combination with a Sony LDP-2000 videodisk player as a training device. It presents training programs that juxtapose live and animated video, still images and still-frame audio, and computer-generated text.

The *Versatile Organization* designed by Wilson Learning Systems of Santa Fe, N.M., is the first interactive courseware that will run on the SonyView system. This course is based on Wilson's "Social Styles" seminars that combine live instruction with videotapes.

The Sony Communications Products Company, based in Park Ridge, N.J., offers the SonyView System 1 in a basic configuration priced at \$7,150. This unit reads programs from 3½-inch disks that select teaching materials stored on videodisks. Another model, the SonyView System 2 priced at \$8,260, is designed to read programs and images from videodisks alone—it meets Pentagon specifications that military training systems use a single, non-magnetic medium.

Although it uses smaller diskettes, the SMC-2000 could function as a somewhat PC-compatible business machine. Sony, however, only plans to market the computer as part of its interactive video system. "It would have taken a much larger investment to develop and market it as a general purpose computer," says Daniel Harris, Sony's national manager for optical media. "We aren't sure we want to get into that tank of sharks."

Formatter Add-On . . . If one of the word processing programs you've been using is *PFS:WRITE*, the *IBM Writing Assistant*, or any other simple word processor or text editor that creates ASCII characters, and you don't want to switch to a more expensive word processor, the *PowerText Formatter* from Beaman Porter, Inc. could be what you need to produce polished documents and form letters.

With *PowerText Formatter* you can add justified margins, proportional spacing, footnotes, multiple columns, headers and footers, tables of contents, automatic outlines, and a variety of other styles and formats to your ASCII documents from other programs. *PowerText Formatter* includes a number of standard styles, such as form letters, schedules, reports, and memos, but you can also create and save your own customized styles.

The *PowerText Formatter* costs \$54.95 and is available from Beaman Porter, Inc., 417 Halstead Ave., Harrison, NY 10528, (914) 835-3010.

Good Help Doesn't Come Cheap . . . For busy power users of *WordStar* and *WordStar 2000* who need immediate technical advice and consultation, MicroPro is now offering help by phone. The new technical support service, the Premium Service Plan, is available Mondays through Fridays from 7:15 a.m. to 4:30 p.m. This "preferred customer support plan" is in addition to MicroPro's already existing technical support hotline, but is strictly for people who are willing to pay the price for immediate answers.



Sony's new View System

MicroPro offers users two payment options for this service. If you expect to use the service often, it is more economical to get the subscription option. A \$90 subscription membership entitles you to 60 minutes of phone support over a four-month period (with a minimum charge of \$10 for a 6.6 minute call—after that it's \$1.50 per minute).

If you don't expect to need the service very often, you can pay on a per-phone call basis for \$2.50 per minute, with the minimum charge per call being \$10.

According to Wink Grellis, a spokeswoman for MicroPro, customers are not charged for a call if the technical support staff can't answer their questions, or if the problem is a result of a bug or faulty disk.

To sign up for the Premium Service Plan, contact MicroPro at 33 San Pablo Ave., San Rafael, CA 94903, (415) 499-1200.

Follow Up . . . Market competitors wasted no time in knocking Microsoft's long awaited Windows environment ("Rivals Toss Stones at Microsoft Windows," *PC News*, August 20, 1985, p.33). Microsoft, however, says that the criticisms ranged from unfair to incorrect. Says company spokesperson Marty Taucher "We changed the product significantly so it would support existing applications. Allegations that it does not, as (Quardeck president) Therese Myers says, and that you need to 'step aside' to support other programs, are flat wrong."

Meanwhile, a Phoenix computer dealer is expanding its multimedia empire. MicroAge Computer Stores' president Jeffrey McKeever recently announced that, in addition to its narrowcasting venture, ("The MicroAge of Television," *PC News*, Volume 4, Number 16, p. 60) the chain has started its own quarterly magazine, *The TV service*, intended to broadcast 20 hours of computer-oriented programming weekly, has sponsors such as IBM, AT&T, Compaq, and Hewlett-Packard, MCS-TV, as it was known, also weathered a name change to MCN-TV, and the parent company is now called Business Management Uplink Service, or BMUS. "Star Trek" fans will recognize this as one case of the acronym preceding that for which it stands.



Jeffrey McKeever

Free C . . . The Mark Williams Company is borrowing a leaf from Borland International's book by offering a low-cost programming tool.

The program in question, *Let's C*, is a \$75 C compiler which, according to company president Robert Swartz, has a "price point no Pascal programmer can pass up."

For a brief time this past summer, even the price was completely beside the point. One thousand copies of the program were given away in a "sweepstakes." The entrants were required to write a 25-or-more-word essay on why they wanted the product. Winners were chosen at random with no eye toward the content of their submissions. Swartz denied that the contest was run that way because of the commonly held notion that programmers can't write.

For more information about *Let's C*, contact the Mark Williams Company at 1430 West Wrightwood Ave., Chicago, IL 60614, (312) 472-6659.

SIGGRAPH Highlights the PC's Graphics Potential

SHOW REPORT

BY DAVID HOFFMAN

SAN FRANCISCO—IBM PCs and compatibles shared floor space with \$500,000 computer installations at SIGGRAPH '85, the 12th annual conference on computer graphics sponsored by the Association for Computing Machinery (ACM). More than 27,000 members of the global art, business, and technical communities mingled on the huge exhibition floor of San Francisco's Moscone Convention Center and in the neighboring hotels where over 250 vendors displayed the world's finest computer graphics systems and accessories. The show also sponsored a full program of panels, technical sessions, and topical issue presentations.

In a year that has seen a big slump in attendance and spirit at computer trade shows, it was refreshing to see a show with crowded aisles and an energetic, attentive group of vendors. Interest in the image processing and CAD/CAM fields appeared strong. Giants such as AT&T and DEC sent representatives, as did major motion picture business players like Lucasfilm, Robert Abel Associates, Bosch,

and MCI/Quantel.

A large number of IBM PCs, PC clones, and near-compatible graphics systems were shown, although most of these used the PC as a host and off-loaded the heavy graphics processing to peripherals. Color graphics boards were shown for the PC with resolutions in excess of

high-resolution monitor containing graphics circuitry that is virtually identical to the that of the IBM Professional Graphics Controller. It will be almost half the price of IBM's card/display combo and can be addressed through the RS-232 port of any computer.

In addition to standard business graphics applications, full-scale point and 3-D animation systems built around the PC were demonstrated. When putting to video, film recorders,

proprietary software and third-party graphics peripherals.

Commodore showed its Amiga computer simultaneously with its New York unveiling. Like the MS-DOS Mindset computer, which also uses custom chips for graphics, Commodore is emphasizing signal and synchronization compatibility with standard video signals, continuing a trend towards interconnection of microcomputers with videodisk and tape devices.

Panel discussions covered graphics workstations, VLSI technology, and solid modeling. Panelists also discussed domestic and international business issues, as well as user interfaces in education and the arts.

Video Madness

Many fine film and video works were displayed throughout the week. These included demonstration reels from prominent commercial and theatrical production companies, as well as experimental pieces from the scientific and academic communities. The work of artists from the United States, Canada, and Japan were represented.

This year's SIGGRAPH was stimulating, and expectations are high for next year's event in Dallas. For information, contact SIGGRAPH '86, Conference Office, 111 East Wacker Drive, Chicago, IL 60601. ■



Cubcomp's 4096-color ModeMaker/300 CAD system was featured at SIGGRAPH

1024 × 1024, although most off-the-shelf software can't take advantage of these products.

Northern Lights

Vermont Microsystems of Winooski, Vt., introduced a

or plotters, some programs rivaled much more expensive systems in quality, although not in speed. Artronics/3M, Cubicomp, and West End Films showed sophisticated turn-key animation products based on

TRANSMISSIONS by CRAIG L. STARK

Since everybody's doin' it, doin' it, doin' it, it should come as no surprise that *PC Magazine's* sibling publication, *PC Tech Journal*, has taken a cue from our Interactive Reader Service and started a bulletin board system (BBS) of its own.

You can now download every program listing that has ever appeared in *PC Tech Journal*, appropriately updated by the 25th of the month prior to an issue's cover date. To reach *PC Tech's* modem dial (301) 576-7285 (the last four digits spell PCTJ). Like *PC Magazine's* own PC-IRS, users can come in at either 1200 or 300 baud and should set up for no parity, 8 data bits, 1

The latest in listings and what's happening on PC Magazine's Interactive Reader Service

stop bit, and either Xmodem or ASCII protocol.

Also like PC-IRS, *PC Tech Journal's* bulletin board is open 24 hours a day, 7 days a week. PC-IRS can handle two users during the day, one at night, and has a full-time seven-user system on the way. As of now, however, *Tech Journal* can only service one caller at a time. So now you have another bulletin board system to curse when you get a seemingly interminable

busy signal.

New on PC-IRS this time are John Dickinson's PRSWAP program, which enables your printer to deal with the IBM graphic characters that currently causes it cardiac arrest, and Charles Petzold's handy DDID program, which doubles the number of directory listings you get on your screen while alphabetizing them, as well. As usual, you can download the .COM versions directly (if your

modem software supports the Xmodem protocol), or you can get the BASIC "turns-into-a-command" files (.ASC) shown in the magazine's programming columns and features, already typed for you. Assembler fans will want the .ASM files, and should also download PRSWAP.DOC, which gives a label-by-label explanation of just how the source code works.

Busy as we are, some 90 to 100 of you do get through to PC-IRS each day, so keep your autodialers calling (212) 696-0360 and we'll keep you up to date on our stock of useful program listings from the pages of *PC Magazine*. ■

LEAVE THE COMPUTER... TAKE THE DRIVE!

With Maynard's Transport™ — the Original Portable Hard Drive!

Now you can leave that heavy "portable" computer on the desk where it belongs and carry up to 20MB of data between home and office. Transport™ comes with easy-release cable and convenient carrying handle. Call or write today for product specifics.

Your Assurance of Quality:

- plated media, double shock-mounted drive
- extensively tested against rigorous performance standards
- backed by industry-leading 1-year warranty

Available in 10MB or 20MB.

Purchase your Transport™ and receive a carrying case at no cost (limited time offer).

CIRCLE 157 ON READER SERVICE CARD

TRANSPORT

PORTABLE HARD DRIVE BY MAYNARD ELECTRONICS



Maynard Electronics

Shaping Tomorrow's Technology

430 E. SEMORAN BLVD., CASSELBERRY, FL 32707

305/331-6402

• PLUS • PLUS • PLUS • PLUS •

IMiGIT PLUS

• PLUS • PLUS • PLUS • PLUS •

PRODUCE STUDIO-QUALITY TRUE-COLOR PICTURES ON YOUR PC



Now you can create and edit studio-quality pictures on your IBM® PC or compatible computer with the IMiGIT PLUS™ color system.

Anything a video camera can see — people, products, scenery and artwork — can be computerized in 256 colors using the IMiGIT PLUS color system. Pictures are captured and displayed in their original "true color" so you do not have to spend hours recoloring to attain a "real-life look". Images can be enhanced with text, line art and other graphics for business presentations, art studio, education, engineering, architecture and television applications.

Professional Quality — Special Effects

Pictures are captured at a resolution of 512 x 512 x 256 colors selectable from a 16 million color palette. Captured images can be modified with editing tools such as: multi-font annotation, line and freehand drawing, filled and unfilled boxes and

circles, texturing, color fill, curve fitting and rubberstamping. A cut and paste feature allows "cut art", previously saved to disk as picture sections, to be recalled and overlaid on the display. This editing sophistication lets you create complex graphics as well as dramatic and illusory special effects.

Designed for the User

The IMiGIT PLUS color system is easy-to-use and versatile. Completely icon-driven, you can quickly learn to master the powerful editing tools. Also, you can select the various editing commands using the keyboard, popular mouse devices or digitizing tablets. Captured color pictures can be displayed for editing, saved and retrieved from disk, printed, and recorded on 35mm slides for professional presentations.

IMiGIT PLUS is available as a hardware/software combination, an add-on system, and as a complete IBM AT graphic workstation. The software and PC-EYE color capture board are priced at \$1,295. The IMiGIT PLUS system includes a color camera, RGB monitor, graphics adapter, software/hardware package with expansion chassis priced at \$9,500. The workstation is priced at \$18,000 and includes an IBM AT with 20MB disk, IMiGIT PLUS software, PC-EYE™ capture board, Colorverter™, graphics display card, digitizing tablet, color camera/accessories, and a high resolution RGB analog monitor.

For more information on IMiGIT PLUS or our other imaging products for applications in data base management, communications and image capture, please write or call 1-800-0CHORUS or 603-424-2900.

TM: IMiGIT PLUS, Colorverter and PC-EYE are trademarks of Chorus Data Systems, Inc.

*: IBM is a trademark of International Business Machines.

CHORUS

DON'T BE A VICTIM OF LAN LARCENY

Instead, purchase the ANEX Multi-PC or Multi-AT, the alternatives to a local area network (LAN) at less than half the cost.

The Multi-PC and Multi-AT can expand your IBM-PC or AT into an easily installed DOS compatible four or eight station multi-user system. Each user can run the same or different programs concurrently and independently while sharing their data in a secure manner.

If you are planning to expand your PC environment, don't become a victim of LAN Larceny. Call ANEX today at (800) 821-4826.



There is no better way

151 North Route 9W, Congers, NY 10920

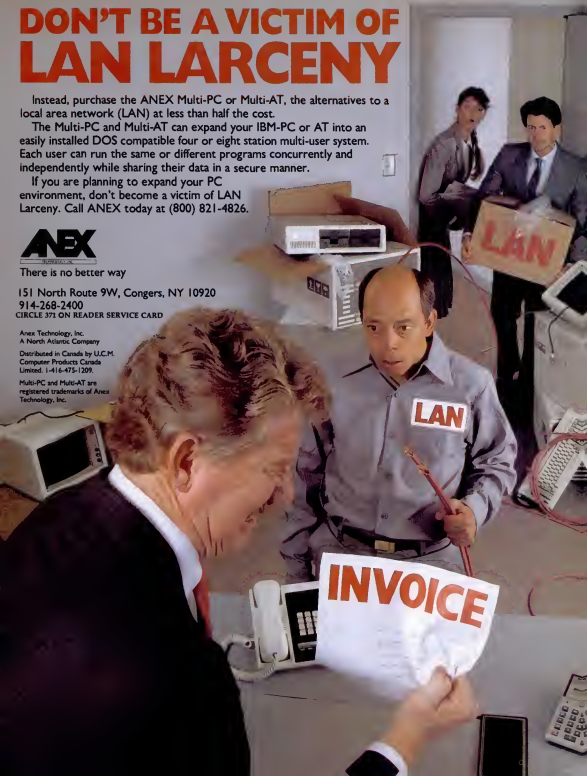
914-268-2400

CIRCLE 373 ON READER SERVICE CARD

Anex Technology, Inc.
A North Atlantic Company

Distributed in Canada by U.C.M.
Computer Products Canada
Limited. 1-416-475-1209.

Multi-PC and Multi-AT are
registered trademarks of Anex
Technology, Inc.



It doesn't have to be complicated to be powerful.



The pen has always been one of the most powerful ways to exchange information and ideas. Yet it's not a complicated tool.

PFS:WRITE is a word processing program that's so powerful, it can meet all your business writing needs. Yet it's so uncomplicated, it's amazingly easy to learn.

WRITE is designed for people without computer expertise. All instructions are written in plain English so you can be productive right away.

With just a few keystrokes, you can make insertions and deletions, create bold face type, even move whole blocks of text.

And if you ever need it, help is just a keystroke away.

Unlike most word processing software, WRITE prints exactly what you see on the screen. Since WRITE's screen resembles a standard sheet of paper, you'll always know what your document will look like *before* you print. With WRITE, it's easy to get it right the first time.

PFS:PROOF is the perfect companion to WRITE. PROOF checks WRITE documents for spelling, typographical errors, irregular capitalization and repeated words. All with just a touch of a key.

WRITE is fully integrated with the PFS Family of Software. So it's easy to use information from other PFS programs and get more done in less time. For example, you can produce personalized form letters complete with addressed envelopes from data stored with PFS:FILE. You can even add a pie chart to the letter, created with PFS:GRAPH, to further illustrate a point.

PFS—it's the powerful software that's simple to learn. It's the power of simplicity.

See your computer dealer for a demonstration and discover how powerful the power of simplicity really is.



PFS SOFTWARE
The Power of Simplicity™

PFS:WRITE runs on Apple IIc and IIe, * IBM, * Compaq, Tandy, * Panasonic,
Data General, Hewlett Packard, and other personal computers. * PFS:PROOF also runs on these personal computers.
© Software Publishing Corporation

PC Speeds Take Flight With New Phoenix Board

FIRST LOOK

BY WINN L. ROSCH

NORWOOD, Mass.—Phoenix Computer Products Corporation hopes to set a new standard in personal computer performance with its Pfister-286, a PC coprocessor board.

Mike Olfe, vice president of Phoenix, claims the coprocessor (also called a "turbo" expansion board) "has proved in our tests to be the fastest product of its kind on the market."

Equipped with an 8-megahertz 80286 microprocessor, an optional 80287 floating-point coprocessor, and up to 2 megabytes of memory, Pfister-286 can make any PC digest data nine times faster than it would unenhanced—or about twice the speed of the high-performance AT.

Slot Cards

Easy to install, Pfister-286 merely slides into any available full-length expansion slot. It does not replace the 8088 microprocessor already in the host system. Instead, the Pfister-286 uses its host's 8088 as an input/output processor to handle the communications ports, screen, keyboard, and disk drives.

Even after the Pfister-286 is physically installed in a system, it can be switched in and out of service by running a utility program. You can choose between the Pfister-286's extremely high processing speed or the 100 percent software compatibility of the host system running its native 8088 brain.

Pfister-286's origins are perhaps just as worthy of consideration as the performance boost it can give to a PC system. It is the first hardware product from Phoenix, a manufacturer perhaps best known for creating the Basic Input/Output System (BIOS) software for many, if not most, PC-compatibles.

UnBIOSed

Phoenix has also written BIOS software for a large number of AT clones; potentially, the company's new productivity-enhancing hardware could end up competing with the high-performance, 80286-based computers that Phoenix's clients are marketing.

Not so, says Olfe. "Pfister is not a change in our business," he says. "For years we've been in the business of selling software to OEM companies. That includes selling co-

poration's past software products, but as simply an extension of the company's programmer support.

All of Phoenix's products have been aimed at the professional programmer. These include *Pmate*, an advanced program code editor/processor; *Plink 86*, a linkage editor; *Pfix 86*, an advanced debugger; *Pre-C*, a C-language program analyzer; and *Pasm 86*, an advanced macro assembler.

Like these software products, Pfister-286 is specially de-

The Pfister-286 can make any PC digest data nine times faster than it would unenhanced.

signed to enhance programmer productivity. These programs slice the time needed for microprocessor-intensive tasks—like program assembly, compiling, and linking—by a factor ranging from two to nine. Pfister-286 gives a corresponding boost to any programmer code throughput.

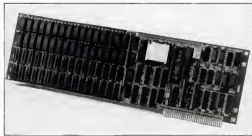
Phoenix also hopes to put Pfister-286 into systems configured by value-added resellers—specialists who sell turnkey systems to business users. "We see a big market for VARs, particularly those who need a competitive edge," notes Olfe.

Programmer Pleaser

Olfe sees Pfister-286 not as a radical departure from the cor-

signed to enhance programmer productivity. These programs slice the time needed for microprocessor-intensive tasks—like program assembly, compiling, and linking—by a factor ranging from two to nine. Pfister-286 gives a corresponding boost to any programmer code throughput.

Pfister-286 hardly has the coprocessor market to itself.



Pfister-286 is equipped with an 8-MHz 80286 microprocessor and up to 2 MB of memory.

however. Its competition includes Orchid Technology's Turbo-186 and Quadram's QuadSprint, which have already established a strong market presence. All of these turbo boards make roughly the same claim—that their higher speed means you'll get your work done faster.

Greed for Speed

According to Olfe, however, Pfister-286 stands out among other turbo boards in two ways. Because it uses an 80286



Mike Olfe

microprocessor rather than the older 8086 or 80186 chips used in other manufacturers' designs, Pfister-286 is more powerful. That gives the programmers who use it more of what they would want a turbo board for—that's speed.

Olfe also expects that the Pfister-286 expansion board will be more AT-compatible than competing products. Other coprocessor boards are designed for high-speed PC compatibility rather than for taking advantage of all the capabilities of the AT.

"I won't guarantee 100 percent AT compatibility, but no one other than IBM can deliver that," says Olfe. "Our product is more compatible with the AT than any other coprocessor board on the market."

"The Company Accountant."



Designed for the small business, The Company Accountant works for you, providing the timely and reliable information needed to develop strategies and make good management decisions.

With the GL, AR, AP, Payroll, and Inventory programs that provide over 51 easy-to-understand reports, The Company Accountant handles your small business accounting needs now and in the future.

A system to fit your needs

The Company Accountant is built to be flexible with programs that can be tailored to your needs. The programs can be used individually or together, with each program fully explained in the clearly written manual.

The manual reviews basic accounting principles with a comprehensive tutorial, a command and report reference, and a complete glossary of accounting and computer terms.

System Requirements

IBM PC, XT, AT or true compatible with 128K RAM. Monochrome or color monitor, DOS 2.0 or greater, 2 320K disk drives or 1 320K disk drive and 1 hard disk. Printer capable of 132 columns.

Speed and accuracy

The Company Accountant is a fully integrated system that makes accounting fast, efficient, and accurate.

Using the double entry method with complete integration, you only enter figures once. And they are always current as of the last transaction.

On demand, The Company Accountant provides a wide variety of reports, ranging from the familiar balance sheet and income statement to customer and vendor activity, payroll information, inventory values, and stock levels.

Double entry, plus...

- Password security
- Hard disk support
- Capacities limited only by disk space
- Creates DIF files for use with other programs
- Data compatible with:
 - Rocky Mountain Desktop Accountant
 - Insoft Accountant
 - Peachtree PeachPak 4 series
- Multiple departments, up to 99
- Customer and vendor mailing labels
- Full audit trail and control reports
- FREE telephone support

Great price

Now double entry accounting becomes simple, reports easy and fast, and your bottom line instantly accessible. And at \$395, very affordable!

To order The Company Accountant, or for more information, pick up the telephone and call (503) 639-4907 TODAY!



IN-HOUSE
SOFTWARE

12088 S.W. Garden Place
Portland, Oregon 97223

The Company Accountant is a trademark of In-House Software

You can also request detailed descriptions of these programs with sample reports by mail. Simply fill out this coupon or attach your business card and mail to In-House Software. Your information will be rushed to you by first-class mail.

VISA, Master Charge & American Express accepted

NAME _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
3 _____ C _____

COM-PAQ-LA-POINTE INC.

SM

#P27

LOW PRICES TO PROFESSIONALS WHO KNOW WHAT THEY WANT AND KNOW HOW TO USE IT!

ALL MAIL: Compaq-LaPointe, Inc.
12060 SW Garden Place, Portland, OR 97223

TO ORDER, CALL (800) 547-1289

TELEX 910 380 3980

HARDWARE & PERIPHERALS FOR YOUR IBM

STOP WAITING

ALL ORDERS ARE SHIPPED THE DAY AIR

EMERY

COMPUTER SYSTEMS

— Call for Details — 256K

IBM - PC

360K Disk Drives by CDC

by CDC

LaserWriter by HP

COMPAQ Computers

CALL

HARD DISKS & TAPE BACKUP

CDC, Internal 20 meg bit for AT

Internal 30 meg bit for AT

Internal 40 meg bit for AT

KAMERIA, 20 meg bit for AT

20 meg bit for AT

MICRO SCIENCE, 10 meg bit for AT

TALL GRASS, 20 meg bit for AT

TALL GRASS, 40 meg bit for AT

FLOPPY DISK DRIVES

CDC, Limited 5.25 warranty. Call for quality prices

Full Height

Half Height

\$109

\$ 89

MONITORS

AMBER, Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

Color 300 - Compaq

OTHER HARDWARE

AT, Super Plus, 64K

Super Plus, 256K, 512K, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

Super Plus, 256M, 512M, 1M

Super Plus, 2M, 4M, 8M, 16M

Super Plus, 32M, 64M, 128M

PRINTERS

DOT MATRIX:

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

EPSON, Super Plus, Full Line

MEMORY

256K CHIP KIT

\$34

64K CHIP KIT

\$6

128K CHIP KIT

\$75

each, 4028 chips

Pages 6 to 7

90 Day Warranty by us

CALL FOR QUANTITY PRICES

ComX

EconoraRAM Plus™

\$265

384K MultiFunction RAM Board

Woods the AT SuperRAM™ with game port

Parasm™ RAM Disk and Spooler Software

EconoraRAM™ 384K

Single Function Board

\$195

With Fastest™, Fully Compatible

Works on DOS 1.2, 2.0 & 3.1

FOR YOUR PC-JR

HATES, Mac II joystick

KEY TRONIC, KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

KX1011 J Keyboard

SOFTWARE FOR YOUR IBM-PC, XT, AT or JR

BUSINESS

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

ANALYTICA, Reflex

BUSINESS

MICROPRO, MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

MultiPlus or SuperPlus

COMMUNIQUEs by CHARLES BERMANT

**This, Ms. Piggy, Goes To the Micro Market**

The IBM personal computer user market will become just a little livelier with the imminent introduction of Muppet Learning Keys for the PCjr. The \$79.95 keyboard, manufactured by Kousa Technologies in conjunction with Jim Henson's Muppet empire, has endless

software possibilities, and packages are already being sold with "Muppet Keyboard Compatible" stickers. The Muppet Learning Keys keyboard has a desktop motif resembling a child's desk, and it is peanut-butter-and-jelly resistant.

Humorist Christopher Cerf,

the project's software design consultant, says that the PCjr version of Muppet Learning Keys has been in development for a while, and will take advantage of the now-discontinued computer's superior graphic capabilities. Cerf says that he thinks there are enough Juniors around to build a solid Muppetkeyter user base. A version which works with the PC is also expected to come out as soon as color monitor compatibility problems are worked out.

When we last saw Cerf he was pondering how the Muppet Learning Keys could be used as an alternate input device for WordStar. He says that, theoretically, it should work.

Incidentally, Cerf is working on two other projects: A device which retrofits PC compatibles so they can be used with a Chiclet-style keyboard and an Apple-based handwriting/database program called *MacForge*.

Jive Aid

A high-placed industry source told us of a top-secret plan for the PC industry to make the world a better place. According to our source, the nation's foremost programmers will each be asked to write a line of code, which will then be assembled into one massive PC program. Profits from its sale will be used to send hardware and software to computer illiterate countries.

The plan calls for software notables to be invited to an enormous, all-night compiling session in a high-security Silicon Valley location. The most famous ones will each make a contribution, with lesser known programmers joining in on a recurring subroutine.

Whatever the outcome of this programming extravaganza, we have been assured by our source that, for the project's participants, it will be strictly a "check your egos at the door" kind of an affair.

Boys Will Be Boys

Tom Snyder is a misunderstood man. It's bad enough having to share a name with an acerbic former talk show host, but now the Cambridge, Mass. software developer is being labeled as sexist.

First, there was a press release about a troop of Girl Scouts visiting his software lab, which he tactlessly titled "Girls Just Want to Have Fun With Computers." Then there was an interview in *The Boston Globe*

where he was quoted as saying girls really don't like machines. Finally, there was the lecture at Harvard, where he suggested that girls are less compulsive and less nerdy about computers. To make matters worse, a female student at the lecture confronted him and swore she

would prove him wrong.

We thought the *Communi-ques* page was the perfect place to give Snyder a chance to clarify his comments. In response, he says that young boys have staked out a position of seniority at computers, and girls have a hard time doing what they want

with the machines.

"There is now a perception that you have an advantage if you are compulsive about computers," says Snyder. "We've created a culture where nerdiness can make money and being called a social cripple isn't bad."

Heaven Can't Wait

Lifestyle analysts are nothing new, but there is now a public domain PC program which analyzes your chances of making it

into the afterlife.

The Supreme Test is the brainchild of IBM employee James Nichols and two friends.

The program's queries cover subject areas from knowledge of biblical details to a determi-

nation of moral fiber. It then computes the possibility of the user's expeditious passing through the pearly gates, and prints out one of 12 preordained judgments.

After using *The Supreme Test* for several hours and failing to get into heaven we thought something was fishy. When we called Nichols, he admitted that the decisions are randomly generated and have nothing to do with how the questions are answered. Further investigation yielded another startling fact: Of the 12 possibilities, not one of them actually allowed people into the great beyond.

To get the program, send \$7 to Cyranos Software, 382 Vassar Rd., Poughkeepsie, NY 12603.

Why Haven't We Heard From You?

If you've ever said to yourself after reading this page, "It doesn't have the unusual or amusing computer story I heard the other day," then you can remedy the situation by sending your story to: *Communi-ques*, PC Magazine, One Park Avenue, New York, NY 10016; (212) 503-5276; MCI Mail 157-9301. We will pay \$50 for each suitable item, and sometimes more for the unsuitable ones.



*Paradise
Makes Graphics
Easy*

The Paradise Modular Graphics Card runs 100% of the software packages with graphics written for the IBM PC standard, on both the standard IBM monochrome and color monitors (and equivalents).

Graphics Cards using Earlier Technologies run only 20% of the software packages with graphics written for the IBM PC standard, and only on the IBM monochrome monitor (and equivalents).

PARADISE RUNS THE SOFTWARE THE OTHER GRAPHICS CARDS DON'T



You can find the Paradise Modular Graphics Card at better IBM PC dealers. If you need more information, call us toll-free at EXT 213 (800) 527-7977 or (800) 822-2020 (inside Calif.) and we'll gladly answer your questions and send you our free "Graphics Information Pack".

PARADISE
SYSTEMS, INC

\$50 TRADE-IN allowance on your old video card.

Paradise will send you a check for \$50 when you send us your old IBM Monochrome Card or Hercules Graphics Card with warranty registration and proof of purchase of a Paradise Modular Graphics Card. Offer expires December 31, 1985.

Trademarks: Paradise, Paradise Modular Graphics Card - Paradise Systems, Inc. Hercules Graphics Card - Hercules Computer Technology. Registered trademarks: IBM International Business Machines, Inc.

COMPLETE SYSTEMS

(Optional local warranty service available in most major metro areas)

IBM PC BASE SYSTEM

IBM PC w/256K

Floppy Drive Controller
2 Double Sided Double
Density Disk Drives

\$1,495.02*



IBM PC HARD DISK SYSTEM

IBM PC w/256K

Floppy Drive Controller
1 Double Sided Double
Density Disk Drive
Half Height 10MB
Disk Subsystem

\$1,749.00*

CALL FOR
LATEST IBM
ANNOUNCEMENTS

CUSTOM
CONFIGURATIONS
WELCOME

COMPAQ™

PORTABLE HARD DISK SYSTEM

w/256K/1 Floppy/Hard Disk



\$2,255.00* w/10MB

\$2,429.00* w/20MB

DESKPRO SYSTEM WITH TAPE BACKUP

640K CPU/1 Floppy/Hard Disk
10MB Tape Drive/Monitor



\$2,951.94* w/10 MB

\$3,151.94* w/20MB

Wholesale Prices Change Rapidly...if you ever see a lower price advertised anywhere please call! You will find the Network's Price will always be the best!

64K IBM PC MEMORY EXPANSION KITS

Quantity Discounts Available.
Guaranteed for Life!



Quantity of 100 Sets

\$3.96* per set

Set of 9 Chips

\$6.75*

BRAND NAME DISKETTES

OS/DD Box of 10 Guaranteed for Life! Not Generic

\$8.95*

DS/DD Bulk Pack Special

Packaged in 50 Guaranteed for Life!

Each **.79***

1/2 HEIGHT DS/DD DISK DRIVES



The Network buys direct
and makes fantastic deals
with manufacturers like
Tandon/CDC/Shugart/Quintel/
TEAC/Hi-tech and others to
bring you fantastic prices on
Name Brand drives for your
PC/AT/XT/Pro Computer.

\$77.50*

Quantity Discounts Available.

INTERNAL PC HARD DISK

Low Power/Automatic Boot. Works on standard PC's
and Compatibles. Includes drive/controller/cables/
mounting hardware and instructions.

Full one year warranty!



10MB

\$385.00*

20MB

\$489.00*

Quantity Discounts Available.

MultiMate™

Professional
Word Processor

\$200.00*

\$265.00*

*Members pay 8% above this wholesale price plus shipping.

CALL TOLL FREE 1-800-621-S-A-V-E (orders and memberships)

In Illinois call (312) 280-0002 Validation code: A107

TM—Registered trademark of IBM and COMPAQ

NETWORK

... WITH THESE 15 UNIQUE BENEFITS

1 COST + 8% PRICING—The NETWORK purchases millions of dollars in merchandise each month. You benefit in receiving the lowest price available and all at just 8% above published dealer wholesale price.

2 OUR 600 PAGE WHOLESALE CATALOG—Members receive our 600 page wholesale catalog containing over 20,000 hardware and software products for the IBM PC, APPLE and over 50 other popular computer systems. THE NETWORK'S CATALOG IS THE LARGEST SINGLE COMPILATION OF PERSONAL COMPUTER PRODUCTS AVAILABLE TODAY, NOW UPDATED QUARTERLY!

3 IN-STOCK INSURED FAST HOME DELIVERY—The NETWORK maintains a giant multi-million dollar inventory of most popular products, allowing us to ship many orders from stock. Non-stock items are typically maintained in local warehouses just days away from The NETWORK and YOU. We pay all insurance expenses on your shipment. EMERGENCY OVERNIGHT SERVICE IS AVAILABLE ON REQUEST.

4 10 DAY RETURN POLICY—If you are not satisfied, for any reason with any hardware component purchased from The NETWORK within 10 days of receipt, we will refund your entire purchase (less shipping) with no questions asked.

5 MEMBERSHIP SATISFACTION GUARANTEE—If for any reason you are not satisfied with your membership within 30 days, we will refund your dues IN FULL.

6 EXPERIENCED CONSULTANTS—The NETWORK hires consultants, not order takers, to aid you in product selection. Our consulting staff possesses in excess of 150 man years of personal computer product experience. We offer our consultants with our money back guarantee: IF ANY PRODUCT RECOMMENDED BY OUR CONSULTING STAFF FAILS TO PERFORM AS PROMISED—WE WILL TAKE IT BACK AT OUR EXPENSE FOR A 100% REFUND.

7 FREE TECHNICAL SUPPORT—The NETWORK supports every product it sells. Our qualified TECH-SUPPORT staff will help you assemble your system, interpret vendor documentation and get your software and hardware to work. WE WILL GIVE YOU ALL THE HELP YOU NEED, WHEN YOU NEED IT—FREE!

8 OPTIONAL BUSINESS RENTAL LIBRARY—All members can join our BUSINESS RENTAL LIBRARY featuring over 1000 available titles for just \$25 PER YEAR above the basic membership fee. This entitles you to rent business software AT JUST 20% OF THE DISCOUNT PRICE FOR A 14 DAY PERIOD. If you decide to keep the software, the entire rental fee is deducted from the purchase price. VIP MEMBERS GET A FULL 30 DAYS for just \$30 above the V.I.P. base fee. This also includes the game library privileges for a \$5 combination savings.

9 OPTIONAL GAME SOFTWARE RENTAL LIBRARY—The Game Rental Library is available to members for just \$10 PER YEAR and permits evaluation (or just enjoyment) of any game or educational software product as above.

10 SPECIAL SAVINGS BULLETINS—THE PRINTOUT Discount Directory at no charge to Network members only! The Printout contains all the New Product listings and price changes you need to keep your Catalog up to date. Also, we buy excess dealer inventories, and store bankruptcy closeouts, which we turn around and make available to our members at fantastic savings via THE PRINTOUT.

11 DISCOUNT BOOK LIBRARY—Working with numerous publishers and distributors, The NETWORK has assembled a library of over 1000 computer related books and manuals at savings of up to 75% from the normal store price.

12 MEMBERSHIP REFERRAL BONUS—Our most valuable source of new members is YOU! To date almost 40% of our members have been referred by word of mouth from other satisfied members. For those of you who refer new members, The NETWORK will credit a cash bonus to your account applicable to any future purchase.

13 CORPORATE ACCOUNT PROGRAM—Almost 50% of The NETWORK's members are corporate buyers and users (see opposite page left). The NETWORK can establish open account status and assign designated account managers to expedite orders, and coordinate multiple location shipments.

14 QUANTITY DISCOUNTS—For large corporations, clubs, and repeat or quantity buyers The NETWORK can extend additional single order discounts, when available to us from our manufacturers.

15 PRICE PROTECTION—The PC industry is crazy!! Prices change not yearly or monthly or even weekly but yearly by day! These changes are sometimes up but are mostly down!! THE NETWORK GUARANTEES THAT IN THE EVENT OF A PRODUCT PRICE REDUCTION, BETWEEN THE TIME YOU PLACE YOUR ORDER AND THE TIME THE PRODUCT SHIPS YOU WILL ONLY PAY THE LOWER AMOUNT!!

CIRCLE 207 ON READER SERVICE CARD

SOLVE PROGRAMMING PROBLEMS THE WAY YOU THINK. PURE AND SYMBOL.



APL★PLUS®/PC IS THE ANSWER.

The shortest distance between two points is a straight line. But unfortunately, that's not the case in programming.

Most languages require you to go through an enormous number of steps before an idea becomes reality.

That's why the APL★PLUS/PC System is such a dramatic and exciting software tool for serious PC programmers and application developers.

Instead of requiring you to learn—and write—long-winded and complicated programs, APL is based on your instinctive ability to deal in symbols. And once you begin using APL's quick notations, you'll find it the ideal programming

environment for all your application needs.

The incredible shortcuts you'll get with APL not only make you more productive, but make programming enjoyable. Intricate calculations and modeling on PC's are a snap. You'll spend less time on drudgery, and more time creating.

Only with APL★PLUS/PC, do you get:

- full-screen editing
- a built-in terminal emulator
- communications
- graphics primitives
- and report formatting.

Writing time-consuming programs like sorting, matrix inversions, and string searching is eliminated. APL's concise notation

already provides these...and more.

No wonder a *PC Magazine* reviewer enthusiastically reacted to our APL★PLUS/PC System with "awe and delight."

So will you. The complete package price is \$595 and major credit cards are accepted.

Act now and we'll send you a free Convincer Kit. Contact your local dealer, or call 800-592-0050 (in Maryland, call 301-984-5123) to order your system, or for more information about our other APL PLUS★WARE™ products—

from our UNIX™ version to our new streamlined Pocket APL.™

You'll see how symbol they are to use, the very first time you use them.



Problem-solving at the speed of thought.

STSC
A Control Company

APL★PLUS/PC System requires 1024K. A soft character set can be used for computers with IBM compatible graphics board. A character generator ROM or software is included for the IBM PC or selected compatibles.

PLUS★WARE and POCKET APL are trademarks of STSC, Inc. APL★PLUS is a registered service mark and trademark of STSC, Inc. UNIX is a trademark of AT&T Bell Laboratories.

CIRCLE 245 ON READER SERVICE CARD

PC UPDATE by VIRGINIA DUDEK

NEW YORK - The Software Group of Ballston Lake, N.Y. has released Version 1.1 of Enable, with major changes made on the original version. Enable now has a complete menu generator that customizes the entire program, plus it now has a window to DOS. In addition, each of the five integrated modules have been enhanced. The word processor now performs auto indexing and has a table of contents plus multi-column copy and move functions and MultiMate compatibility, as well. The spreadsheet supports Lotus's 1-2-3 macros. Users can translate existing macros or create new ones using the same 1-2-3 commands. Additional file-maintenance commands are included in the database. The graphics module now supports the Hercules graphics card, and the telecommunications end provides terminal emulation for VT-100 and VT-52 terminals. "We will upgrade Enable two times a year in order to remain in the leading edge of technology," claims Laura Hoffman, vice president of marketing. Current users can receive a free update by sending in their registration cards from Version 1.0 to the Software Group.

Decision Support Software of McLean, Virginia has enhanced Expert Choice, a decision support system for executives. New features include a link to Lotus's 1-2-3, enhanced what-if capabilities, cut-and-paste editing features, and quick-and-dirty calculations. Send in the program disk plus \$50 for a new program disk with the additional documentation. New manuals are \$25 extra.

The enhanced VTR 6050 Voice Terminal by VOTAN of Fremont, Calif. now offers complete voice input/output functions for ASCII computers and terminals with local disk storage. In the previous version, all data was stored on the host mainframe. Now, VTR allows voice access to data. Messages do

not have to be stored on the host computer but can be stored on the VOTAN terminal on the 31/2-inch disk drive. Also, Ctrl and Alt sequences can be associated with a word, such as boldface or save. This key definition allows more voice command options. Upgrades are available from VOTAN or from your salesman.

Version 4.0 of CHASM, the "cheap assembler for the IBM PC," was recently announced by Whitman Software of Lansdale, Penn. CHASM is now written in Pascal instead of BASIC. The macro assembler now runs 12 times faster, has an expandable symbol table that uses all available memory, and an improved macro facility. Operand expressions are now allowed, and full DOS 2.0 support is provided with paths for all filenames and assembly results. For updates, send a check for the difference between your original purchase price and \$40 to Whitman's new address: P.O. Box 1157, N. Wales, Penn. 19454, (215) 641-7114.

Short takes: Volkswriter Deluxe Version 2.2 from Lifetree Software in Monterey, Calif. is now faster, supports IBM TopView, and can display 43 lines on screen when used with the IBM Graphics Adapter. Updates for 2.0 and 2.1 users are \$30 and include a new manual. Users of 1.2 or the International Edition send \$100...DataWorks Corp. of San Diego, Calif. has enhanced DataFlo, its manufacturing management program. Version 3.2 has increased data entry processing speed as well as other efficiency enhancements. DataWorks provides an on-line upgrade based on the type of maintenance agreement you chose.

Be a contributor to PC Update. Write or call Virginia Dudek, PC Magazine, One Park Avenue, NY, NY 10016, (212) 503-5265

Attache Makes its Case For TopView Environment

New accounting software is the product of a joint project with IBM.

BY VIRGINIA DUDEK

ANN ARBOR, Mich.—Attache Software, Inc., which markets accounting software packages *Business Pack I & II*, has unveiled a program that professes to be the first accounting software to take full advantage of IBM's TopView windowing system.

2+2 Easy Accounting Software combines windowing and context-sensitive help features with Attache Passport, a new utility feature built into 2+2. Attache Passport allows you to transfer data between 2+2 and other business software systems, such as 1-2-3, WordStar, and dBASE II. It uses the windowing capability to transfer data from applications programs and between program modules. Users can view both windows on-screen at the same time.

Attache's program modules include accounts receivable, in-

ventory control, accounts payable, general ledger, invoicing, and sales analysis. The modules can be purchased separately or in multifunction business packs.

Attache's 2+2 is the result of a joint development project between the company and IBM. 2+2 is the only accounting software that IBM distributes in Canada (the product had a planned launch date in the United States in late August).

A recent survey conducted by *Executive Computing* magazine says that 50 percent of accounting software owners do not use their program after purchase "because it's too complicated," according to Gary Blom, Attache president. "That's the basis for 2+2."

Blom claims that based on "human factors" testing done with average people, Attache estimates that new users can have 2+2 up and running in 1 day. He adds that 2+2 is targeted for small- to medium-sized businesses, though it could handle accounts for larger corporations as well.

Attache's 2+2 Easy Accounting Software is made for the AT, XT, PC, and compatibles and requires 256K bytes of RAM minimum. It will also run on future IBM LAN products. It costs \$695 per module. *Business Pack I* contains accounts receivable, invoicing/sales analysis, and inventory control for \$1,595. *Business Pack II* includes accounts payable and general ledger for \$1,225.

Contact us for other low prices on hardware and software.
Next Day Air Extra

FREE SHIPPING
NO SURCHARGE FOR



OR



Call for latest prices.

10, 20, 33 and 44 MEG INTERNAL AND EXTERNAL HARD DISK SYSTEMS

	10 MEG	20 MEG	33 MEG	44 MEG
Internal	\$409	\$539	\$929	\$1129
External	\$559	\$689	\$1029	\$1229



Half Height

Externals mounted with independent power supply and fan. Fully DOS 2.X or 3.X compatible. Both Internals and Externals boot from Hard Disk. 33 and 44 Meg Internal Disks include extended power supply. The system comes complete and ready to install with the Hard Disk, Controller, Cables, Manual, Software, and Mounting Hardware. One Year Warranty.

10, 20, and 33 Meg Hard Disks are available with combined Floppy/Hard Disk Controller Card for additional \$75.



COMPAQ[®]
DESKPRO 286[™]

CALL

It simply works better.

COMPAQ[®]

Functional equivalent to a Compaq Plus.

\$2549

256K, 1/360K drive,
10 Meg Internal



Now using 3 1/2" shock-mounted Winchester drives. The same as used in the Compaq Plus[™]. Also available with 2 half-height drives and 10 MEG HD—**\$2749**

Or upgrade your Compaq to a Compaq Plus[™] equivalent with our 3 1/2" shock-mounted Winchester disk kit. Includes Hard Disk, Controller, Cables, Manual, software, and Mounting Hardware. One year warranty.

\$519

CALL



IBM PC[™]



CALL

COMPAQ[®]
DESKPRO[™]

It simply works better.

640K, One 360K Drive,
One 10 Meg Internal Hard Drive
Type Backup Unit.

\$3495

Includes Monitor

With 20 Meg Internal Hard Drive—\$3625

With 33 Meg Internal Hard Drive—\$4015

With 44 Meg Internal Hard Drive—\$4215



Compaq is a registered trademark and Compaq Plus and Deskpro are trademarks of Compaq Computer Corporation.

DOWNTIME BY WINN L. ROSCH

PC Babble: New Paths In Voice Recognition



When voice recognition finally comes of age, my PC will probably refuse to process another byte. If only it could hear all the vile oaths that I've heaped upon its deaf little ears. I'm sure it would instantly switch to a "Parity Check 1" error more endurable than the coldest boot.

Despite the latest wave of voice recognition hardware, my PC is purring along fine with its keyboard still in place. Occasionally it tunes into something that I say—and have trained it to recognize—to give me a tiny, high-tech thrill. But for my day-to-day computing, I still find that my fingers are more limber than my tongue.

As good as today's voice recognition hardware is, I can't agree with promoters who promise that tomorrow we'll all be talking our way through J-2-J. Although I have no doubt that someday computers will understand commands in normal English, by that time no one will be bothering with the ancient caballa of the spreadsheet to solve business problems.

Talk Talk

Today's voice recognition systems still fall short of their ultimate ideal. When you opt for voice recognition rather than keyboarding, you only trade learning to type for learning to talk. You have to mold your speech to the limitations of the machine.

Worse, business-oriented voice recognition doesn't mix well with the environment in which it seeks to be used. In today's open office, an overabundance of young executives and PCs, and an undersupply of systems savvy, could cause

techno-babble to take on new meaninglessness. Moreover, no business analyst is going to want all his cohorts to hear him blunder his way through a simple business problem.

Wrong Number

Voice recognition does have a positive future, however. But I believe the new technology will have to find new applications to really take off, and that's the biggest problem the listening computer faces.

My own exploration into voice recognition was based on the premise that human language is the densest possible packing scheme for ideas. I figured that using English and a combination of voice synthesis and voice recognition, I could make two PCs communicate at a rate that might blast through the 9,600-bps serial port limit.

I borrowed a Speech Master voice synthesizer and a Voice Recognition Board from Tecmar and immediately faced a vocabulary problem. At most, the system could identify 200 unique words; hardly enough to convey more than the simplest thoughts.

After I ruled out using a limited vocabulary language like Pidgin as counterproductive, I was forced to transmit data letter by letter. The good news was that it worked. The bad news was that the transmission required a second-long pause between letters because the system could not handle connected speech. With that restriction, my throughput totaled the equivalent of something around a blurring 20 baud.

Surfing on the crest of that success, I switched over to the

Pronounce system by MicroPhonics to take advantage of the truly exemplary software that accompanies the single-card system. Essentially a DOS device driver that can be easily modified by a simple menu system, the Pronounce software lets you adapt voice synthesis to any program that you can run on your PC. The words you choose to speak, up to a vocabulary limit of 128, can each replace up to 256 separate keystrokes, be they characters or control codes, boilerplate text or spreadsheet macros.

Think of the things you could do with Pronounce. A single grunt could spell out half of your next business letter. It's clear that simple commands are, of course, a better vocabulary choice.

The Pronounce software tops competing voice recognition programs by being instantly available when you need to change vocabulary or retrain the one that you have established. Even the training process itself is easier. In many cases, speaking a word once is sufficient training, although several go 'rounds may be necessary to distinguish word pairs.

Tongue Tied

Alas, I found using the Pronounce system with the programs that I run every day to be somewhat akin to mountain climbing in hard-helmeted deep-sea diving gear. For anyone who has his choice of typing or Pronouncing, the keyboard is still keen—and winning—competition.

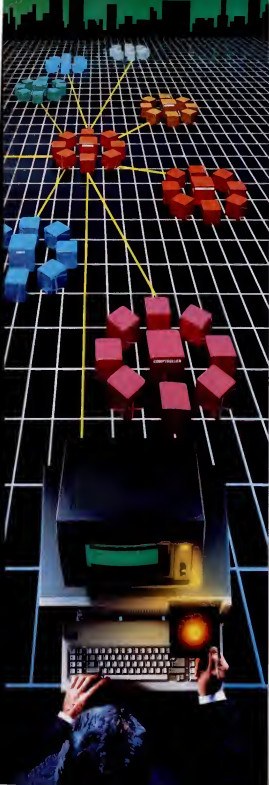
In areas that the keyboard can't compete, however, Pronounce earns its laurels. Where

keys fear to tread, your voice can take command. Anywhere people can't type—because of harsh environments, hands-full machinery operation, or physical handicaps—voice recognition will be hard to beat. Pronounce has already been put to work in major corporations helping people with strong minds overcome physical handicaps.

With the Pronounce software, you don't have to be a programming guru to put voice recognition to work today and explore the new applications of tomorrow. If you're creative, you can make the system into almost anything you want—from vocal ProKey to a tongue mouse.

About the only thing that might possibly stand in the way of the general acceptance of the system is its tiny headset microphone, which MicroPhonics supplies as part of the system. At first, I rejected the headset mike as a technical tether too short for most tempers. After a few minutes of watching MTV, however, I knew that headset-miked jocks, as objects of adulation, will soon make this new electronic style seem as natural in polite company as a New Wave haircut. Technology triumphs again. ■

Pronounce
MicroPhonics Technology Corporation
234 S.W. 43d St.
P.O. Box 7458
Renton, WA 98057
(206) 251-9009
List Price: \$595
Requires: 256K RAM,
DOS 1.0 or later.



We've Put a Local Area Network on a Disk

Corporate Information Sharing. It's been described as the key to increasing a company's productivity. It's also why large networks of PC's are becoming more and more common in the workplace....In spite of the fact that they're costly, difficult to install, and incompatible with much existing software.

Finally, there's a solution to this corporate dilemma. Its name is LANLink™

A Software-Driven LAN That Uses Standard, RS-232 Ports. A major breakthrough in local area networks, LANLink™ uses your computers' existing serial ports and runs under PC-DOS.

Because all of the intelligence the network requires is on the server and satellite diskettes, expensive network interface boards aren't required.

A Powerful Network That's Cost-Consious. If you've been pricing board-driven LAN's, you already know that they can cost over \$1,000 per workstation. LANLink™ is different.


Boasting a data transfer rate in excess of 100,000 BPS, LANLink™ is compatible with a wide range of programs. And because special boards aren't required, installation costs are one-third that of a traditional network.

A Network Designed the Way Business Works. With LANLink™ you're able to customize your network along departmental lines using a data-sharing hierarchy and password-protected access.

Get Started With LANLink™ TODAY. Call The Software Link TODAY for complete details and the authorized dealer nearest you. The LANLink™ Starter Kit, priced at \$495, comes complete with network software for both a server and a satellite computer. For a limited time, 50 feet of RS-232 cable will be included free of charge.

LANLink™ is immediately available and comes with a money-back guarantee. VISA, MC, AMEX accepted.

LANLink™

 **THE SOFTWARE LINK, INC.**

Developers of MultiLink™ and MultiLink Advanced™

8601 Dunwoody Place, Suite 632, Atlanta, GA 30338 Telex 4996147 SWLINK

CALL: 404/998-0700

Dealer Inquiries Invited

THE SOFTWARE LINK, INC./CANADA

400 Esna Park Drive, Suite 18, Toronto (Markham), Ont. L3R 3K2 CALL 416/477-5480

MultiLink, MultiLink Advanced & LANLink are trademarks of The Software Link, Inc. PC-DOS is a trademark of IBM Corp. CIRCLE 393 ON READER SERVICE CARD

Introducing In•a•Vision

Complex Drawing Made Easy

We created In•a•Vision just for you. The engineer who needs more productive drafting support. The designer who needs versatility for alternate ideas or quick revisions. The architect who needs to manage a variety of working drawings. And the businessman who needs first-class presentation materials as well as detailed flow charts and organization charts.

Point. Click. Draw.

Now all you do to create complex technical drawings, systems designs, blueprints, diagrams, illustrations, and proposals is point,

click and draw. With In•a•Vision's mouse support, windowing, icons, and pull-down menus, you produce drawings more quickly, accurately and efficiently than ever before.

In•a•Vision's advanced technology includes many features not found on comparable systems costing thousands more. For example,

you can pan around in a user-definable drawing space up to 68" x 68" and zoom in on specific areas for greater detail. Scale, rotate and dimension symbols, fill an area with your choices of predefined colors and patterns, as well as draw lines with multiple styles and widths. Other features include overlays, predefined and user-definable page sizes, rulers, grids, and symbol libraries.

Multi-tasking in a PC-based CAD system.

In•a•Vision uses multi-tasking to enable you to continue drawing while printing hard copies as well as edit multiple drawings simultaneously.

Unlike more expensive CAD systems, In•a•Vision is easy to install and use. Even the computer novice can be productive immediately. And In•a•Vision is not copy-protected.

Ten Day Trial Period.

We're so sure In•a•Vision will

make you more productive, we'll give you ten days to prove it to yourself. If In•a•Vision doesn't improve your productivity, return it within ten days for a full refund.

In•a•Vision will make your complex drawing tasks simple and make you more productive. Satisfaction guaranteed. Dial 800-272-3729 to order or for a free brochure. In Texas

or for customer support, call (214) 234-1769. MICROGRAFX, Inc., 1820 North Greenville Avenue, Richardson, Texas 75081.

MICROGRAFX™
The Picture of Success.

(Most popular graphics cards, plotters and printers supported.)
Microsoft Windows compatible. Call for specific operating
environment requirements.

CIRCLE 311 ON READER SERVICE CARD

In•a•Vision and MICROGRAFX are trademarks of
MICROGRAFX, Inc.
Windows and Microsoft are trademarks of Microsoft, Inc.

A Tale of 286s

To jazz up the PC Magazine booth at the National Computer Conference, our editors experimented with Compaq Deskpro 286s and a computer-based demonstrator, getting closer to the state of the art than they expected.

On the eve of the National Computer Conference in Chicago, I sat in my hotel room thinking about the past several weeks and the following week's Siggraph computer-graphics conference in San Francisco. To say that the pace has been hectic is like saying that the federal deficit is large.

Of course, everything would have been a little calmer if we hadn't decided to liven up our NCC booth with Compaq Deskpro 286s and a simple computer-based demonstration that would put the full text of *PC Magazine* on-line, making it available for random access, browsing, and reprinting. Like all simple projects, this one had too many variables and we had too little time to work out the kinks.

The easiest part was getting the full text. Another Ziff-Davis company, Information Access, offers a variety of bibliographic services, including the full text of *PC Magazine* and countless others on the Dialog network. A phone call to its office in Belmont, California, produced a 9-track tape that we loaded on our mainframe. One of our programmers massaged the formats and downloaded the files to a Compaq Deskpro 286 with an Irma card. The Compaq's snazzy little DC1000 tape cartridges are the ideal transfer medium to handle the 12 or so megabytes that comprise *PC Magazine* from the beginning of 1984 to the present. Specifically, they made it a snap to reload the files onto a Portable 286, which also has the tape drive.

While the bits flew around, I investigated a number of text indexing and retrieval packages. The one I liked best,

Textbank/PC, is more expensive and more powerful than any of the more usual PC-based packages. *Textbank/PC* allows you to break articles into "zones" such as title, description, author, publication date, and text. Within these zones



Bill Machrone

or within an entire article, you can search for any word, phrase, or combination of phrases. You can also apply Boolean logic to them to hone in on exactly what you want to see. Then you can display just the specific zones or subzones or the entire article of those that meet the search criteria. From there you can browse through the selected subset, eliminating any you don't want. Finally, you can print out the remaining articles.

The Right Vehicle

Of course, you can't use a high-performance system such as this on a PC with a couple of floppies. Even the best soft-

ware needs all the hardware advantages it can get in order to give you what you want in seconds instead of minutes.

We bolstered a pair of Compaq Portable 286s with Tallgrass 6180 disk drive/tape combination units—80 megabytes of disk drive and 60 megabytes of tape backup. To handle the output, Canon USA was nice enough to lend us a matched set of its new laser printers. After supplying the print engine to everyone else, the company finally decided to put out a printer of its own.

If you've ever done any kind of full-text indexing, you know what a slow process it can be. To ease the burden, we used yet another Portable 286 and an original Deskpro 286. While one was converting file formats, another was formatting tapes. The third handled indexing, and on the fourth, we tuned all the variables, such as printer setup strings, disk buffers, and keyboard macros.

I was aided and abetted in this enterprise by one of *Textbank/PC*'s creators, Andy Lynn. Lynn is primarily responsible for the part of the program (named Ziggy, for Zone Identification Generator) that analyzes a document's zones and sets the stage for generating the index. Lynn brought the latest version of the search module, which was three times faster than the old one. We settled down in my dining room one Friday afternoon, with all four Compaqs and a laser printer blazing. Lynn finished his part of the project by mid-Saturday, while I continued on until late Sunday night.

Lynn was impressed with our display of processing firepower but says that he



20MB FULL HEIGHT DRIVE FOR IBM AT

- Access time is 2 x's faster than any other 1/2 height drive

\$795



10-45MB 1/4" STREAMING TAPE by WANGTEK

- Software includes image backup, restore and file by file

Internal - \$865
External - \$965

IBM



ALSO AVAILABLE

- Mounting bracket for COMPAQ DESKPRO and IBM AT
- Data cable
- Y or power cable



10/20 MB HARD DISK SUBSYSTEM by Microscience

- Half height
- Low power consumption
- Controller, software, cables included

10MB \$535
20MB \$660



20MB STREAMING TAPE DRIVE by MEMTEC

- Backup 10MB in under 4 minutes
- Software included

\$725

300/1200 MODEM

- 100% Hayes Smart Modem and Bell 103/212 compatible
- Also supports COM 3 and COM 4

Internal - \$225
External - \$325



COMPAQ



AT&T

10MB FLOPPY TAPE BACKUP

- Uses regular floppy controller
- External unit also available

Irwin - \$525
Interdyne - \$649



COLOR/MONO GRAPHIC DISPLAY CARD

- 720 x 350 resolution in monochrome
- 640 x 200 resolution in color

Color Mono - \$280
Hercules Compatible Mono - \$255



EXPANSION CHASSIS

- Various I/O slots / models to choose
- Supports all IBM controllers and memory expansion

\$665

IBM, AT & T AND
COMPAQ ARE
REGISTERED
TRADEMARKS.

VISA OR MC
ADD 3%
TO ALL PRICES



HALF-HEIGHT FLOPPY DRIVE

- 100% IBM compatible
- 350K byte capacity and 48 TPI

\$119



MEMORY EXPANSION CARD

- Serial, parallel game ports and clock/calendar
- Expansion capability to 384K
- Includes 64K memory Free

\$199



It's Your Move To Improve!

For years we have been selling our products through distributors hoping that they will provide better technical support and services to our customers. Lately, we find that most of them are not really technical and sensitive enough to satisfy our customer needs. In order to provide quality products and services at factory prices, we have decided to sell to you direct by passing distributors. Each of our products comes standard with an easy do-it-yourself installation guide. If you still have problems, our highly trained technical staff is only a phone call away to answer any of your questions.

To further back up our commitment for high quality and better services, our policy is one year warranty and a 30-day no-questions-asked money back guarantee on most of our products.

Remember. No loss. No stalemate. Make your move to improve. Call us at our hotline.

IN USA CALL: 800-JEDEN US
IN CALIFORNIA CALL: 800-JEDEN CA
For a free catalog, call 714-545-8108
CIRCLE 160 ON READER SERVICE CARD

JEDEN

COMPUTER PERIPHERALS

16650 Harbor Blvd. Suite C-15
Fountain Valley, CA 92706

IN CANADA 416-842-3177
912 Barton Street, East, Suite 26
Hamilton, Ontario, Canada L8L3C2

FROM EDITOR'S SCREEN

still wouldn't trade his NCR Tower (a UNIX system) for it. Oh, well.

If you want maximum speed from a product like *Textbank/PC*, your index will actually be larger than the document you're indexing. That may sound inefficient, but it's the price you have to pay if you're using state of the art. Big, fast hard disks are especially attractive when files get this large. We came within a hairbreadth of running our text retrieval system on Tallgrass's new write-once-read-many (WORM) laser disk, but we ran out of time. I see it and its progeny as the answer to large-scale information retrieval needs.

Magazines are an obvious target for full-text indexes, but stopping there would sell the medium short. What about executable code, pictures, animation, and even sound? When you're talking a half a gigabyte on a few bucks' worth of media, the sky's the limit. We'll give you the full report on this exciting device in an upcoming issue.

On with the Show

At NCC, product-testing editor Mike O'Conne, executive editor Paul Somerson, and I had set up the equipment in the booth, ready for the opening-day hordes. We had backups. We had backups of backups. Everything seemed to be under control, so I turned in early, requesting a wake-up call for 7 a.m. Nothing could go wrong. But still I worried.

My big mistake was worrying. You see, computers can smell fear. And just as bees will only sting people who are afraid of them, computers will only misbehave for users who doubt them. Also like bees, computers have an ephemeral means of communication. So it won't necessarily be the computer in your immediate view that will attack. In my case, it was the hotel's computer.

I sent my wake-up call through at 3 a.m. A scratchily merry recorded voice bade me rise and shine, which I dutifully did. I showered and shaved, then looked at my watch. It made no sense. I turned it upside down. It still made no sense. I peeked around the heavy curtain, expecting to see a beautiful sunrise but instead saw Chicago's slumbering majesty. The enormous unfunniness of the joke slowly

dawned on me. I resolved not to so much as think about computers for the next few hours and went back to bed.

The Compaqs, of course, never let us down. I had learned not to worry, but I

checked out of the hotel and paid cash for a room at another one nearby.

Well, it's getting into the wee hours, and the phone is ringing. . . . Who could it be at this hour? ■

A NEW KIND OF COMPUTER STORE

★ WE DISCOUNT EVERYTHING ★

OKIDATA

OKIDATA 192	349.95
OKIDATA 193	499.95
OKIDATA 84	649.95
OKIDATA 80	229.95

C.I.T.O.H.

C.I.T.O.H. 8510 APPLE	299.95
C.I.T.O.H. 8510 PLUS	319.95
C.I.T.O.H. F-10 40	699.95
C.I.T.O.H. F-10 55	1099.95

star

GEMINI SG-10	229.95
GEMINI SG-15	379.95

Panasonic

1091	249.95
1092	379.95

NEC

ELF-360	449.95
8050	619.95
3550	999.95
8850	1429.95

Hayes

2400 RS232	599.95
1200 RS232	399.95
★ 1200 B INTERNAL	349.95

PROMODEM 1200B IBM	269.95
PROMODEM 1200	299.95

SIDEKICK	39.95
TURBO PASCAL	49.95
FLIGHT SIMULATOR	36.95
MANAGING YOUR \$	109.95

COPY II PC 29.95

★ ★ CALL FOR OTHER PRICES ★ ★
BECAUSE HARDWARE AND SOFTWARE PRICES ARE CHANGING SO RAPIDLY, WE URGE YOU TO CALL US FOR OUR VERY LOWEST CURRENT PRICES!

WE APPRECIATE YOUR BUSINESS and will do everything we can to make you happy.
TERMS: F.O.B. Westminster, CA. We accept VISA, Mastercard, Cash, Money Orders, Checks. Certified Checks are better. Purchase Orders (2% 10 Net 15). Add 2% for bank cards & P.O.'s. Ask about our return policy. Prices are subject to change and hopefully will go down. Subject to stock on hand.

SPECIAL EDITION

EPSON

EPSON FX 85	349.95
EPSON FX 185	489.95
EPSON LX 80	289.95
EPSON LX 80	489.95
EPSON LX 1500	879.95

brother

BROTHER HA 15	369.95
BROTHER HA 25	499.95
BROTHER HA 35	749.95

TOSHIBA

TOSHIBA 1340	549.95
TOSHIBA 1351	1079.95
TOSHIBA 351	1095.95

SILVER-REED

SILVER REED 550	399.95
SILVER REED 770	779.95

Lotus 1-2-3

★★★ SYMPHONY	409.95
--------------	--------

FONTRIX	99.95
FONTPAKS 1 THRU 11 EA.	19.95
GATO	29.95
AST SIX PAK + 64K w/FREE	
BORLAND SIDEKICK	249.95
64K RAM (9) SET	9.95
256K CHIPS EA.	4.95

SIDEWAYS 44.95

GARDEN OF EDEN

COMPUTERS

ORDERS ONLY

800-762-3227

OUTSIDE CALIFORNIA ONLY

800-331-0045

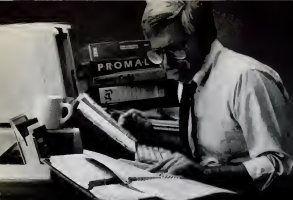
INSIDE CALIFORNIA

16485 Magnolia, Westminster, CA 92683

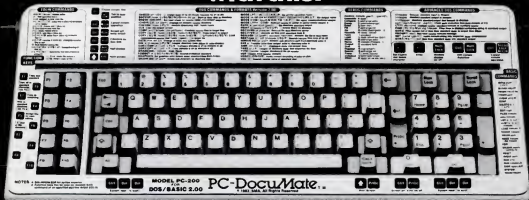
1/2 mile N. of the 405 Freeway

Mon-Fri 10-6:30 Sat 10-5

CLOSED SUNDAYS & TUESDAYS



**Instead of this... ...you can have this
with this!**



\$14.95

Why waste time digging through cumbersome manuals for operating commands? PC-DocuMate™ templates put computer commands at your fingertips for the IBM® PC, PC-XT, Compaq®, Apple® IIe and Commodore® 64.

You'll have quick reference for needed commands, options and formats right on your keyboard with a PC-DocuMate template.

Our professionally designed, two-sided templates are made of durable, non-glare plastic. Satisfaction is guaranteed—fully—or your money back.

Templates Now Available—

IBM PC/XT and COMPAQ:
DOS/BASIC (2.0 & 2.1) • 1-2-3 •
Symphony • dBASE II • dBASE III
• Framework • MultiMate
• Wordstar • EasyWriter II •
MULTIPLAN (IBM or Microsoft) •
PeachText 5000 • SUPERCALC³ •
VisiCalc • TURBO PASCAL •
WordPerfect • VOLKSWRITER
DELUXE • Do-It-Yourself.
PCjr: DOS/BASIC 2.10 • dBASE II
• Do-It-Yourself.
COMMODORE 64 (Single-sided):
C-64 BASIC • EasyScript •
CalcResult • Do-It-Yourself.
Apple IIe: AppleWriter II •
WordStar • VisiCalc • dBASE II
• Quickfile • Do-It-Yourself.

How to Order:

To order by credit card call toll free

1-800-762-7874

(In NC call 919-787-7703)

Or mail us your personal check, money order or MasterCard/Visa information.

NC residents include 4.5% sales tax. Please add \$1.50 for shipping and handling per order. (Foreign orders, except Canada, add \$15.00 per order). U.S. funds only. No CODs.

Our Guarantee: Use your template for 20 days. If you are not completely satisfied return it to us (undamaged) for a full refund.

SMAN

Systems Management Associates
3700 Computer Drive, Dept. B-10
Raleigh, North Carolina 27609

Letters to PC Magazine

Sorry, Wrong Number

Please ask your readers to dial *only* (212) 696-0360 to reach the *PC Magazine* Interactive Reader Service (PC-IRS) bulletin board. If there's a busy signal, many readers dial 696-0361 and 0362, but instead of your magazine, they reach two terribly harassed Cal-Pacific salespeople who have been overwhelmed by the deluge of wrong numbers.

Barbara Barran
Cal-Pacific
New York, New York

We know that our PC-IRS bulletin board is very popular and that many people get busy signals when trying to call it. But please be patient and keep trying. And don't call any other number except (212) 696-0360.—Ed.

Notes on WordStar and SideKick

Stephen Manes's article on the bliss of using *SideKick* with *WordStar* downplays the virtues of this combination for floppy disk users ("SideKick Puts Windows on WordStar's World," *PC Magazine*, Volume 4 Number 13). I do not have a hard disk on my PC, but I have come to depend on *SideKick* for many functions, including using a notepad file with the .LOG feature to maintain telephone and other diaries (the time and date are instantly recorded as long as you remember to use only uppercase letters when putting .LOG at the top left of the file) and to keep names and addresses that I later put into a database manager program.

I would like to share with other readers a tip I have on sending information from a notepad file to a *WordStar* file. In his article, Manes described a block command method using Ctrl-KW to create a new file and this works fine. However, if you want to import an entire notepad file, you simply use Ctrl-KR while in *WordStar* and give the name of the notepad file created by *SideKick*, wherever it resides. The entire *SideKick* file is read into your *WordStar* file, and then you can clean out

features or parts of the text that you do not want.

Bonnie J. McCay
New Brunswick, New Jersey

Stephen Manes replies:

I developed my more convoluted approach only because the Ctrl-KR method



won't import the notepad file from the noncurrent directory where it usually resides on a hard disk. That's a nice tip about upercasing the .LOG, though (and it is still relevant for SideKick Version 1.5); now I know why that feature kept pooping out on me.

Boston Computer Society Standards

Your article about the Boston Computer Society (BCS) contained numerous factual errors, fabricated quotations, and misleading statements ("A Boston Society Grows Up," *PC Magazine*, Volume 4 Number 15). We're very concerned that you have misrepresented many aspects of the BCS to your readers.

The BCS was originally conceived as—and has always been—a staunch ally of consumers. In fact, few organizations have done more than the BCS to promote advocacy issues for computer consumers. The reporter's statement that we "have not taken part in the current trend for user groups to act as advocates for micro consumers" is ridiculous and unfounded. Moreover, the statement attributed to me, "Ralph Nader, we're not," was concocted by the reporter.

Contrary to the reporter's assertion, I never stated that ADAPSO's proposed

hardware key system for copy protection would "hurt more than it would help." I said that I believe software copy protection is an enormously complicated problem for both consumers and manufacturers and that there is no single solution for either side's needs. I also said that I don't think a solution has yet been proposed that is either so consistent with or divergent from the interests of consumers that the BCS should take an active lobbying role on their behalf (even though we are prepared to do so in the future).

The BCS does not hold itself out to be a market research organization for personal computer manufacturers. Although many manufacturers do take advantage of our meetings to better understand how consumers react to their products, we would never compromise our commitment to our members or to the public for the sake of assisting a manufacturer's market research.

As an example of how manufacturers respond to BCS meetings, I mentioned that after a BCS meeting in which MicroPro participated last year, the company arranged to have its local sales staff immediately return to California to take any feedback they got from BCS members to the company's product development group. Although I believe MicroPro's decision to remove copy protection from its *WordStar 2000* was prompted by user complaints nationwide, I never claimed that it was a direct result of the BCS meeting. The quotation attributed to me that MicroPro "had a cadre of people in the aisles, all taking down comments about their software" is another invention of the author.

Although the BCS has hosted debates in the past, and both Adam Osborne and Philippe Kahn have spoken at BCS meetings, we have never arranged for either of them to debate software pricing or desktop management software. As a policy, we do not promote nonexistent services.

The quotation that I "do not foresee [the BCS] joining forces with other user

The power behind the glory.

Primavera Project Planner gives successful project managers the little things they want most out of life...control, control, control. What they like, you'll like...

Our capability for managing projects up to 10,000 activities. Resource leveling and cost management. The ability to compare current schedules to targets and to perform "what-if" analysis. Plus, standard and custom reports to give you the who, what, when, where and why in virtually any format you need.

You can even produce high quality bar charts and network logic diagrams using our optional graphics package, Primavision.

Interested? Contact us for more information or the name of a nearby Primavera dealer. Or buy our full-featured demo (handles 60 activities) for just \$75—and put the power at your fingertips.

Primavera Project Planner...the most project management you can get from a micro.



PRIMAVERA SYSTEMS, INC. Suite 925 • Two Bala Plaza
Bala Cynwyd, PA 19004 • (215) 667-8600 • Telex 910 997 0484

LETTERS

groups across the country to advance joint concerns" is not only false, but offensive. We work closely with many groups throughout the United States and in other countries and strongly believe that groups must work together to help strengthen each other and serve users. I did mention an idea that we've had for a new national organization modeled loosely after the American Automobile Association, but I explained that this organization would not be intended to compete with existing groups, but rather to disseminate resources.

The Boston Computer Society is the largest user group in the country. Its record is one of unstinting consumer advocacy and leadership.

The rest of the article is laced with further bizarre statements attributed to me. I think it is unprofessional and unbecoming to your magazine to exercise such journalistic liberties.

Jonathan Rotenberg
The Boston Computer Society
Boston, Massachusetts

PC Magazine regrets the errors in the profile of Jonathan Rotenberg and the Boston Computer Society. BCS is the largest and one of the finest user groups in the country. Its record, reflected in its meetings, publications, and programs, is one of unstinting consumer advocacy and leadership. We recognize the vital role of user groups and actively support them through speaker programs, public-domain software distribution, and user advocacy.—Ed.

Full Support of the EGA or Not
Diane Burns's and S. Venit's article "Word Takes Another Forward Stride" (PC Magazine, Volume 4 Number 13) says that Word Version 2.0 supports the EGA (Enhanced Graphics Adapter). Well, I guess that depends on how you interpret "supports."

The EGA includes a character set for

PROVEN!



PC/FOCUS outloads, outruns, outperforms and outreports dBase III™ and R:Base™ 5000.

Don't believe us. Believe National Software Testing Laboratories of Philadelphia. They proved PC/FOCUS to be clearly superior to dBase III™ and R:Base™ 5000. Here's how:

Several real-world, business situations were created to examine each system's speed and capability.

Their findings are published in an extensive report now available to you free of charge. Their results, as stated by NSTL, showed that..."PC/FOCUS was faster overall than the other programs tested." For example...

Database Loading:

In this test series, database loading time for each DBMS was measured by loading three transaction files. Eight separate test runs were conducted, with PC/FOCUS averaging 20.2% faster than dBase III™ and 37.3% faster than R:Base™ 5000.

Database Reporting:

Report requests of various levels of complexity were run against single and multiple databases. Eighteen separate test runs were conducted, with PC/FOCUS averaging 45.2% faster than dBase III™ and 40.0% faster than R:Base™ 5000.

REPORTING FROM DATABASES AVERAGE ACROSS 18 TEST RUNS

PC/FOCUS	<div></div>	100
R:Base 5000	<div></div>	223.7
dBase III	<div></div>	407.9

There's more to the study than can be described in this ad. Lots more tests...and much more proof. So, we've reproduced the NSTL Performance Comparison in full. To obtain your free copy, just fill out the coupon and mail it to Donald Wszolek, Dept. U1, Information Builders, Inc., 1250 Broadway, New York, NY 10001.

dBase III is a trademark of Ashton-Tate.
R:Base 5000 is a trademark of Micromin.



Dear Don;
I want proof! Please send my free copy of
"A Performance Comparison" to:

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

PC/FOCUS

INFORMATION BUILDERS, INC.

New York (212) 736-4433 • Washington, D.C.: (703) 276-9006 • Chicago: (312) 789-0515 • St. Louis: (314) 434-7500 • Dallas: (214) 659-9890
San Jose: (408) 293-6600 • Los Angeles: (213) 615-0736 • Houston: (713) 952-0260 • Boston: (617) 272-8600 • Atlanta: (404) 980-0474

CIRCLE 273 ON READER SERVICE CARD

88 Ryders Lane, Stratford, Connecticut 06497

ACCESSORIES

[illegible]

CALL
CALL
CALL
CALL
CALL

ORDERS ONLY
TOLL FREE
1-800-382-2242
7 DAYS/WK
9AM to 11PM EST

84.00
715.00

Young Luther M.
SPRINGFIELD
SA White
Summer Income

Enter the
Summer
Income
Plan
Now!

—

[illegible][illegible]

PARTS		
24.00	BRACKET	930.00
24.00	2400 P.M.	150.00
	HE 15 L	500.00
	HE 25	114.00
23.00	HE 35	
	C. IVON	
18.00	8710	219.00
20.00	4400 P.	349.00
18.00	FIB-35	1,710.00
25.00	Stewart & S. JEP	475.00
	also order 2 special plates	
21.00		20.00
21.00	BRACE	

GAMES			
ALPHABET		03-01	379.00
ALPHABET		LE 00	222.00
ALPHABET		New Models and all others	CALL
ALPHABET	35.00	0001	CALL
ALPHABET	35.00	0002	CALL
ALPHABET	35.00	0003	CALL
ALPHABET	35.00	0004	CALL
ALPHABET	35.00	0005	CALL
ALPHABET	35.00	0006	CALL
ALPHABET	35.00	0007	CALL
ALPHABET	35.00	0008	CALL
ALPHABET	35.00	0009	CALL
ALPHABET	35.00	0010	CALL
ALPHABET	35.00	0011	CALL
ALPHABET	35.00	0012	CALL
ALPHABET	35.00	0013	CALL
ALPHABET	35.00	0014	CALL
ALPHABET	35.00	0015	CALL
ALPHABET	35.00	0016	CALL
ALPHABET	35.00	0017	CALL
ALPHABET	35.00	0018	CALL
ALPHABET	35.00	0019	CALL
ALPHABET	35.00	0020	CALL
ALPHABET	35.00	0021	CALL
ALPHABET	35.00	0022	CALL
ALPHABET	35.00	0023	CALL
ALPHABET	35.00	0024	CALL
ALPHABET	35.00	0025	CALL
ALPHABET	35.00	0026	CALL
ALPHABET	35.00	0027	CALL
ALPHABET	35.00	0028	CALL
ALPHABET	35.00	0029	CALL
ALPHABET	35.00	0030	CALL
ALPHABET	35.00	0031	CALL
ALPHABET	35.00	0032	CALL
ALPHABET	35.00	0033	CALL
ALPHABET	35.00	0034	CALL
ALPHABET	35.00	0035	CALL
ALPHABET	35.00	0036	CALL
ALPHABET	35.00	0037	CALL
ALPHABET	35.00	0038	CALL
ALPHABET	35.00	0039	CALL
ALPHABET	35.00	0040	CALL
ALPHABET	35.00	0041	CALL
ALPHABET	35.00	0042	CALL
ALPHABET	35.00	0043	CALL
ALPHABET	35.00	0044	CALL
ALPHABET	35.00	0045	CALL
ALPHABET	35.00	0046	CALL
ALPHABET	35.00	0047	CALL
ALPHABET	35.00	0048	CALL
ALPHABET	35.00	0049	CALL
ALPHABET	35.00	0050	CALL
ALPHABET	35.00	0051	CALL
ALPHABET	35.00	0052	CALL
ALPHABET	35.00	0053	CALL
ALPHABET	35.00	0054	CALL
ALPHABET	35.00	0055	CALL
ALPHABET	35.00	0056	CALL
ALPHABET	35.00	0057	CALL
ALPHABET	35.00	0058	CALL
ALPHABET	35.00	0059	CALL
ALPHABET	35.00	0060	CALL
ALPHABET	35.00	0061	CALL
ALPHABET	35.00	0062	CALL
ALPHABET	35.00	0063	CALL
ALPHABET	35.00	0064	CALL
ALPHABET	35.00	0065	CALL
ALPHABET	35.00	0066	CALL
ALPHABET	35.00	0067	CALL
ALPHABET	35.00	0068	CALL
ALPHABET	35.00	0069	CALL
ALPHABET	35.00	0070	CALL
ALPHABET	35.00	0071	CALL
ALPHABET	35.00	0072	CALL
ALPHABET	35.00	0073	CALL
ALPHABET	35.00	0074	CALL
ALPHABET	35.00	0075	CALL
ALPHABET	35.00	0076	CALL
ALPHABET	35.00	0077	CALL
ALPHABET	35.00	0078	CALL
ALPHABET	35.00	0079	CALL
ALPHABET	35.00	0080	CALL
ALPHABET	35.00	0081	CALL
ALPHABET	35.00	0082	CALL
ALPHABET	35.00	0083	CALL
ALPHABET	35.00	0084	CALL
ALPHABET	35.00	0085	CALL
ALPHABET	35.00	0086	CALL
ALPHABET	35.00	0087	CALL
ALPHABET	35.00	0088	CALL
ALPHABET	35.00	0089	CALL
ALPHABET	35.00	0090	CALL
ALPHABET	35.00	0091	CALL
ALPHABET	35.00	0092	CALL
ALPHABET	35.00	0093	CALL
ALPHABET	35.00	0094	CALL
ALPHABET	35.00	0095	CALL
ALPHABET	35.00	0096	CALL
ALPHABET	35.00	0097	CALL
ALPHABET	35.00	0098	CALL
ALPHABET	35.00	0099	CALL
ALPHABET	35.00	0100	CALL
ALPHABET	35.00	0101	CALL
ALPHABET	35.00	0102	CALL
ALPHABET	35.00	0103	CALL
ALPHABET	35.00	0104	CALL
ALPHABET	35.00	0105	CALL
ALPHABET	35.00	0106	CALL
ALPHABET	35.00	0107	CALL
ALPHABET	35.00	0108	CALL
ALPHABET	35.00	0109	CALL
ALPHABET	35.00	0110	CALL
ALPHABET	35.00	0111	CALL
ALPHABET	35.00	0112	CALL
ALPHABET	35.00	0113	CALL
ALPHABET	35.00	0114	CALL
ALPHABET	35.00	0115	CALL
ALPHABET	35.00	0116	CALL
ALPHABET	35.00	0117	CALL
ALPHABET	35.00	0118	CALL
ALPHABET	35.00	0119	CALL
ALPHABET	35.00	0120	CALL
ALPHABET	35.00	0121	CALL
ALPHABET	35.00	0122	CALL
ALPHABET	35.00	0123	CALL
ALPHABET	35.00	0124	CALL
ALPHABET	35.00	0125	CALL
ALPHABET	35.00	0126	CALL
ALPHABET	35.00	0127	CALL
ALPHABET	35.00	0128	CALL
ALPHABET	35.00	0129	CALL
ALPHABET	35.00	0130	CALL
ALPHABET	35.00	0131	CALL
ALPHABET	35.00	0132	CALL
ALPHABET	35.00	0133	CALL
ALPHABET	35.00	0134	CALL
ALPHABET	35.00	0135	CALL
ALPHABET	35.00	0136	CALL
ALPHABET	35.00	0137	CALL
ALPHABET	35.00	0138	CALL
ALPHABET	35.00	0139	CALL
ALPHABET	35.00	0140	CALL
ALPHABET	35.00	0141	CALL
ALPHABET	35.00	0142	CALL
ALPHABET	35.00	0143	CALL
ALPHABET	35.00	0144	CALL
ALPHABET	35.00	0145	CALL
ALPHABET	35.00	0146	CALL
ALPHABET	35.00	0147	CALL
ALPHABET	35.00	0148	CALL
ALPHABET	35.00	0149	CALL
ALPHABET	35.00	0150	CALL
ALPHABET	35.00	0151	CALL
ALPHABET	35.00	0152	CALL
ALPHABET	35.00	0153	CALL
ALPHABET	35.00	0154	CALL
ALPHABET	35.00	0155	CALL
ALPHABET	35.00	0156	CALL
ALPHABET	35.00	0157	CALL
ALPHABET	35.00	0158	CALL
ALPHABET	35.00	0159	CALL
ALPHABET	35.00	0160	CALL
ALPHABET	35.00	0161	CALL
ALPHABET	35.00	0162	CALL
ALPHABET	35.00	0163	CALL
ALPHABET	35.00	0164	CALL
ALPHABET	35.00	0165	CALL
ALPHABET	35.00	0166	CALL
ALPHABET	35.00	0167	CALL
ALPHABET	35.00	0168	CALL
ALPHABET	35.00	0169	CALL
ALPHABET	35.00	0170	CALL
ALPHABET	35.00	0171	CALL
ALPHABET	35.00	0172	CALL
ALPHABET	35.00	0173	CALL
ALPHABET	35.00	0174	CALL
ALPHABET	35.00	0175	CALL
ALPHABET	35.00	0176	CALL
ALPHABET	35.00	0177	CALL
ALPHABET	35.00	0178	CALL
ALPHABET	35.00	0179	CALL
ALPHABET	35.00	0180	CALL
ALPHABET	35.00	0181	CALL
ALPHABET	35.00	0182	CALL
ALPHABET	35.00	0183	CALL
ALPHABET	35.00	0184	CALL
ALPHABET	35.00	0185	CALL
ALPHABET	35.00	0186	CALL
ALPHABET	35.00	0187	CALL
ALPHABET	35.00	0188	CALL
ALPHABET	35.00	0189	CALL
ALPHABET	35.00	0190	CALL
ALPHABET	35.00	0191	CALL
ALPHABET	35.00	0192	CALL
ALPHABET	35.00	0193	CALL
ALPHABET	35.00	0194	CALL
ALPHABET	35.00	0195	CALL
ALPHABET	35.00	0196	CALL
ALPHABET	35.00	0197	CALL
ALPHABET	35.00	0198	CALL
ALPHABET	35.00	0199	CALL
ALPHABET	35.00	0200	CALL
ALPHABET	35.00	0201	CALL
ALPHABET	35.00	0202	CALL
ALPHABET	35.00	0203	CALL
ALPHABET	35.00	0204	CALL
ALPHABET	35.00	0205	CALL
ALPHABET	35.00	0206	CALL
ALPHABET	35.00	0207	CALL
ALPHABET	35.00	0208	CALL
ALPHABET	35.00	0209	CALL
ALPHABET	35.00	0210	CALL
ALPHABET	35.00	0211	CALL
ALPHABET	35.00	0212	CALL
ALPHABET	35.00	0213	CALL
ALPHABET	35.00	0214	CALL
ALPHABET	35.00	0215	CALL
ALPHABET	35.00	0216	CALL
ALPHABET	35.00	0217	CALL
ALPHABET	35.00	0218	CALL
ALPHABET	35.00	0219	CALL
ALPHABET	35.00	0220	CALL
ALPHABET	35.00	0221	CALL
ALPHABET	35.00	0222	CALL
ALPHABET	35.00	0223	CALL
ALPHABET	35.00	0224	CALL
ALPHABET	35.00	0225	CALL
ALPHABET	35.00	0226	CALL
ALPHABET	35.00	0227	CALL
ALPHABET	35.00	0228	CALL
ALPHABET	35.00	0229	CALL
ALPHABET	35.00	0230	CALL
ALPHABET	35.00	0231	CALL
ALPHABET	35.00	0232	CALL
ALPHABET	35.00	0233	CALL
ALPHABET	35.00	0234	CALL
ALPHABET	35.00	0235	CALL
ALPHABET	35.00	0236	CALL
ALPHABET	35.00	0237	CALL
ALPHABET	35.00	0238	CALL
ALPHABET	35.00	0239	CALL
ALPHABET	35.00	0240	CALL
ALPHABET	35.00	0241	CALL
ALPHABET	35.00	0242	CALL
ALPHABET	35.00	0243	CALL
ALPHABET	35.00	0244	CALL
ALPHABET	35.00	0245	CALL
ALPHABET	35.00	0246	CALL
ALPHABET	35.00	0247	CALL
ALPHABET	35.00	0248	CALL
ALPHABET	35.00	0249	CALL
ALPHABET	35.00	0250	CALL
ALPHABET	35.00	0251	CALL
ALPHABET	35.00	0252	CALL
ALPHABET	35.00	0253	CALL
ALPHABET	35.00	0254	CALL
ALPHABET	35.00	0255	CALL
ALPHABET	35.00	0256	CALL
ALPHABET	35.00	0257	CALL
ALPHABET	35.00	0258	CALL
ALPHABET	35.00	0259	CALL
ALPHABET	35.00	0260	CALL
ALPHABET	35.00	0261	CALL
ALPHABET	35.00	0262	CALL
ALPHABET	35.00	0263	CALL
ALPHABET	35.00	0264	CALL
ALPHABET	35.00	0265	CALL
ALPHABET	35.00	0266	CALL
ALPHABET	35.00	0267	CALL
ALPHABET	35.00	0268	CALL
ALPHABET	35.00	0269	CALL
ALPHABET	35.00	0270	CALL
ALPHABET	35.00	0271	CALL
ALPHABET	35.00	0272	CALL
ALPHABET	35.00	0273	CALL
ALPHABET	35.00	0274	CALL
ALPHABET	35.00	0275	CALL
ALPHABET	35.00	0276	CALL
ALPHABET	35.00	0277	CALL
ALPHABET	35.00	0278	CALL
ALPHABET	35.00	0279	CALL
ALPHABET	35.00	0280	CALL
ALPHABET	35.00	0281	CALL
ALPHABET	35.00	0282	CALL
ALPHABET	35.00	0283	CALL
ALPHABET	35.00	0284	CALL
ALPHABET	35.00	0285	CALL
ALPHABET	35.00	0286	CALL
ALPHABET	35.00	0287	CALL
ALPHABET	35.00	0288	CALL
ALPHABET	35.00	0289	CALL
ALPHABET	35.00	0290	CALL
ALPHABET	35.00	0291	CALL
ALPHABET	35.00	0292	CALL
ALPHABET	35.00	0293	CALL
ALPHABET	35.00	0294	CALL
ALPHABET	35.00	0295	CALL
ALPHABET	35.00	0296	CALL
ALPHABET	35.00	0297	CALL
ALPHABET	35.00	0298	CALL
ALPHABET	35.00	0299	CALL
ALPHABET	35.00	0300	CALL
ALPHABET	35.00	0301	CALL
ALPHABET	35.00	0302	CALL
ALPHABET	35.00	0303	CALL
ALPHABET	35.00	0304	CALL
ALPHABET	35.00	0305	CALL
ALPHABET	35.00	0306	CALL
ALPHABET	35.00	0307	CALL
ALPHABET	35.00	0308	CALL
ALPHABET	35.00	0309	CALL
ALPHABET	35.00	0310	CALL
ALPHABET	35.00	0311	CALL
ALPHABET	35.00	0312	CALL
ALPHABET	35.00	0313	CALL
ALPHABET	35.00	0314	CALL
ALPHABET	35.00	0315	CALL
ALPHABET	35.00	0316	CALL
ALPHABET	35.00	0317	CALL
ALPHABET	35.00	0318	CALL
ALPHABET	35.00	0319	CALL
ALPHABET	35.00	0320	CALL
ALPHABET	35.00	0321	CALL
ALPHABET	35.00	0322	CALL
ALPHABET	35.00	03	

TOSHIBA		SPECIALS	
AMRICE			
Color 200 ***	385.00	Video 200 ***	215.00
Video 200 ***	450.00	Video 200 ***	275.00
Video 210 ***	550.00	Video 210 ***	347.00
Color 210 ***	645.00	Color 210 ***	78.00
Color 210 ***	575.00	Color 210 ***	345.00
Color 210 ***	175.00	Color 210 ***	185.00
Color 210 ***	235.00	Color 210 ***	416.00
Color 210 ***	235.00	Color 210 ***	215.00
Color 210 ***	235.00	Color 210 ***	54.00
Color 210 ***	235.00	Color 210 ***	247.00
Color 210 ***	235.00	Color 210 ***	16.00
Color 210 ***	235.00	Color 210 ***	14.00
Color 210 ***	235.00	Color 210 ***	21.00

If something you would like is not listed, just call. For inquiries and Connecticut Orders Call (203) 375-3860.

Fair Fax! Delivery sends customer's check, cash, or money order. Personal and company check allow 3 weeks to clear. Shipping—Self-serve \$25.00 minimum; C.O.G. add an additional \$17.50. Shipping—Hardware (please call). Alaska, Hawaii, Canada, P.O. APO, and FPO \$35.00 minimum. Foreign orders—\$18.00 minimum and 5% of all orders over \$180.00. Maximum \$18.00. (Include card no. and expiration date). Commercial residents add 7.5% sales tax. We ship same day for most orders. Prices subject to change without notice. All returns must have a return authorization number. Call 203-735-3860 to obtain one before returning goods for replacement. Defective merchandise replaced with same item, mfg. We do not guarantee availability. All sales are final.

CIRCLE 126 ON READER SERVICE CARD

We did it for dBASE™



Now Fox & Geller unlocks the macro power of Lotus 1-2-3.[®] **QUICKMAC™**

Fox & Geller's QUICKCODE™ became a best-seller because it enabled *any* dBASE™ user to create a workable program in minutes. And with our new QUICKMAC™, Lotus 1-2-3 users can now create sophisticated 1-2-3 macro programs in seconds.

No More Cryptic, Cumbersome Macro Coding.

QUICKMAC unlocks the macro power of 1-2-3 by giving the world's leading integrated software package a powerful, English-like language all its own. A language that lets you completely forget about the tedious coding conventions of 1-2-3's macro facility.

Use straightforward English statements to write your macros. Give them simple English names of your own choosing. And take full advantage of QUICKMAC's powerful:

- DO WHILE loops
- CALL/RETURN statements
- GO TO statements
- CASE statements
- IF THEN/ELSE statements
- DEFINE variables
- FOR/NEXT statements
- MENU builder

When you finish writing your program, just press a special key and QUICKMAC will automatically generate the correct 1-2-3 macro code for the entire program and insert it directly into a worksheet.

You Already Know How to Use It.

Because QUICKMAC resides in low memory with 1-2-3 running on top, it's never more than a keystroke away. One key brings up its Lotus-like menu—without changing disks—while another one returns you to 1-2-3 when you're ready.

With QUICKMAC, you'll also benefit from the attention we've paid to the little things that can make life with Lotus 1-2-3 easier—and a lot more productive.

Things like our inclusion of a special facility for creating, storing and playing back keyboard macros. Menus that are indistinguishable from those of 1-2-3. Documentation designed to fit right into your 1-2-3 manual. And no copy protection, for easier hard disk installation.

QUICKMAC: The \$99 Macro Solution.

Finally, another little detail we took a hard look at was price: just \$99. A small price to pay for 1-2-3 macro programming freedom. We also offer PASSKEY™ password protection for your files. And a version of QUICKMAC for Symphony® will be available soon.

Call us today at 800-221-0156 (or 201-794-8883 in New Jersey) to find out how and where to get your copy.

dBASE™ of Ashton-Tate, Inc.
QUICKCODE, QUICKMAC™ and PASSKEY™ of Fox & Geller, Inc.
Lotus 1-2-3 and Symphony are registered trademarks of Lotus
Development Corporation.

Fox & Geller, Inc.
604 Market Street
Elmwood Park, New Jersey 07407



GET THE KNOW-HOW TO REPAIR EVERY COMPUTER ON THIS PAGE. AND MORE.



IBM is a Registered Trademark of International Business Machines Corporation.
Epson is a Registered Trademark of Epson America, Inc.
Apple and the Apple logo are Registered Trademarks of Apple Computer, Inc.
Compaq is a Registered Trademark of COMPAQ Computer Corporation.
© 1988 AT&T Technologies, Inc.

Learn the Basics the NRI Way—and Earn Good Money Troubleshooting Any Brand of Computer

The biggest growth in jobs between now and 1995, according to Department of Labor estimates, will occur in the computer service and repair business, where demand for trained technicians will actually double.

You can cash in on this opportunity, once you've learned all the basics of computers the NRI Way. NRI's practical combination of "reason-why" theory and "hands-on" building skills starts you with the fundamentals of electronics, then guides you through advanced electronic circuitry and into computer electronics.

You Build—and Keep—a 16-bit Sanyo personal computer

The vital core of your training is the step-by-step building of the 16-bit Sanyo MBC-550 series computer. Once you've mastered the details of this IBM-PC compatible machine, you'll be qualified to service and repair virtually every major brand of computer, plus many popular peripheral and accessory devices.

With NRI training, you learn at your own convenience, in your own home. You set the pace—without classroom pressures, rigid night-school schedules, or wasted time. You build the Sanyo IBM compatible computer from the keyboard up, with your own personal NRI instructor and the complete NRI

technical staff ready to answer your questions or give you guidance and special help whenever you need it.

Your NRI course includes installation and troubleshooting of the "Intelligent" keyboard, power supply, and disk drive, plus you'll check out the 8088 microprocessor functions, using machine language. You'll also prepare the interfaces for future peripherals such as printers and joysticks.

100-Page Free Catalog Tells More

Send the coupon today for NRI's big 100-page color catalog on electronics training, which gives you all the facts about NRI courses in Microcomputers and other growing high-tech career fields. If the coupon is missing, write to NRI Schools, 3939 Wisconsin Ave., NW, Washington, D.C. 20016.

Your NRI course includes the Sanyo 16-bit IBM compatible computer with 128K RAM, monitor, double density double sided disk drive, and "Intelligent" keyboard; the NRI Discovery Lab™, teaching circuit design and operations; a Digital Multimeter; Bundled Spread Sheet and Word Processing Software worth over \$1000 at retail—and more.



LETTERS

use with 43 lines on the enhanced display, and the display set at 43 lines with 80 characters across is fairly readable. In my opinion, a word processing package doesn't support the EGA unless it supports the densest display format available. Word Version 2.0 runs in 25-line mode even if you preset the EGA to 43-



line mode and specify the /H option.

The DIP switches on the EGA specify the default mode. For the enhanced display, they may specify either color or enhanced. I believe support of the EGA also implies that a package will either run in both modes or will automatically set the EGA to enhanced mode. Preferably, it should restore the EGA to the original mode upon terminating. Word Version 2.0 requires that you set the EGA to enhanced mode prior to calling up the program.

Setting the DIP switches to enhanced mode is a nuisance if you also have software written for the obsolete color/graphics adapter. And, of course, the Word Version 2.0 documentation does not warn you about the DIP switches or that a new version of the Microsoft Mouse is required.

As a reader of PC Magazine, I find it helpful when reviewers specify the level of support for new hardware.

Seymour J. Metz
Annandale, Virginia

NRI SCHOOLS

McGraw-Hill Continuing Education Center
3939 Wisconsin Avenue, Washington, DC 20016
We'll give you tomorrow.

✓ CHECK ONE FREE CATALOG ONLY

- ☐ Computer Electronics with Microcomputers
- ☐ Data Communications
- ☐ Robotics & Industrial Controls
- ☐ Video Electronics Servicing

- ☐ Electronic Design Technology
- ☐ Digital Electronics
- ☐ Satellite Communications
- ☐ Communications Electronics
- ☐ Industrial Electronics

For Career courses approved under GI Bill,
☐ check for details.

- ☐ Basic Electronics
- ☐ Telephone Servicing
- ☐ Small Engine Servicing
- ☐ Building Construction

Name (Please Print) _____

Age _____

Street _____

City/State/Zip _____

Accredited by the National Home Study Council

156-109

We reinvented the wheel

Sigma Designs challenges the belief that tape backup and random file access are mutually exclusive.

Introducing the OneReel Tape™

Sigma Designs reinvents the "classic" magnetic tape, replacing it with the OneReel Tape, a unique device with the speed and capacity for high-performance backup and the flexibility of random access.

Movable Drive, Removable Media
The OneReel Tape plugs directly into

the PC's external floppy controller connector, making the rounds in the office and at home. It backs up entire or partial disks with ease and speed, using 10MB removable reels.

Unprecedented Versatility

Much more than just backup, the OneReel Tape lets you create true working duplicates of hard disks, and read and update files directly from the tape.

No other device has ever been as capable.

Precision is Everything

Structurally designed to minimize mechanical problems, and with tape operations under integral micro-computer control, the OneReel Tape yields

the ultimate in data integrity and media interchangeability.

Don't Accept Any Less

The OneReel Tape: compact, elegant, powerful and affordable. Reinvented by Sigma Designs, for today's complex data needs.

For the Sigma Designs source nearest you, call us at (408) 943-9480.

Intelligent solutions for your PC



**SIGMA
DESIGNS**

SIGMA DESIGNS, INC. 20750 Ende Avenue
San Jose, CA 95130, Tel: 415-943-9480

OneReel Tape is a trademark of Sigma Designs, Inc.

THE PROFESSIONAL'S CHOICE

Lotus 1-2-3 \$309	Lotus Symphony \$429	dBase III \$369	FrameWork \$369	MultiMate \$249	Word Perfect \$209
--------------------------------	-----------------------------------	---------------------------	---------------------------	---------------------------	---------------------------------

Software

Word Processing Editors

FANCY FONT	\$139
FINAL WORD	\$199
MICROSOFT WORD	\$229
MULTIMATE	\$249
OFFICE WRITER/	\$259
SPELLER	\$ 85
PFS: WRITE	\$ 85
SAMMA WORD III	\$159
VOLKSWRITER	\$159
DELUXE	\$159
VOLKSWRITER	\$159
SCIENTIFIC	\$279
THE WORD PLUS	\$195
(GAS)	\$209
WORD PERFECT	\$189
WORDSTAR 2000	\$259
WORDSTAR 2000*	\$219
WORDSTAR PRO	\$299
XYWRITE II*	\$199

Spreadsheets/

Integrated Packages	
ELECTRIC DESK	\$209
ENABLE	\$239
FRAMEWORK	\$349
JAZZ	\$199
LOTUS 1-2-3	\$319
MULTIPLAN	\$1325
OPEN ACCESS	\$219
SAMMA PLUS	\$379
SMART SYSTEM	\$559
SPIREADJUST	\$179
AUDITOR	\$179
SUPERCALC 3	\$429
SYMPHONY	\$429

Accounting

RPI	\$319
GREAT PLAINS	\$479
US EASYBUSINESS	\$279
ONE WRITE PLUS	\$379
OPEN SYSTEMS	\$399
PEACHTREE	\$299
REAL WORLD	\$259
STATE OF THE ART	\$389
STAR ACCOUNTING	\$349
PARTNER	\$249
STAR ACCOUNTING	\$249
PARTNER II	\$249

Desktop Environments

DESK ORGANIZER	\$ 79
GEM DESKTOP	\$ 49
VIDEOMAC	\$ 49

Database Systems

ALPHA DATA BASE	
MANAGER II	\$179
CLIPPER	\$499
CLOUT V.2.0	\$139
CONDOR III	\$299
CORNERSTONE	\$299
DBASE II	\$299
DBASE III	\$269
KNOWLEDGE MAN	\$269
MS FILE PFS	\$199
REPORT	\$219
POWERBASE	\$189
QUICKCODE III	\$189
QUICKREPORT	\$189
R RASE 4860	\$249
R RASE 5000	\$359
REFLEX	\$329
REVELATION	\$729

Languages/Utilities

CONCURRENT QOS	\$199
CON C COMPILER	\$299
DIGITAL RESEARCH	\$219
C COMPILER	\$179
DR FOOTRAN 17	\$259
LATTICE C COMPILER	\$249
MICROSOFT C	\$249
COMPILER	\$249
MS BASIC COMPILER	\$249
MS FORTRAN	\$ 99
NORTON UTILITIES	\$ 99
TURBO PASCAL	\$ 99
KEMIX	\$349

Project Management

HARVARD PROJECT	\$209
MANAGER	\$259
HARVARD TOTAL	\$159
PROJECT MANAGER	\$259
MICROSOFT	\$159
PROJECT	\$259
PERTMASTER	\$449
SCITOR PROJECT	\$259
5000 W GRAPHICS	\$549
SUPERPROJECT	\$189
TIME LINE	\$249

Communications/

Productivity Tools	
CONSTATK	\$365
PROKEY	\$ 99
REMOUSE	\$ 99
RELAY	\$119
SMARTCOM II	\$299
SUPERKEY	\$ 99

Graphics/Statistics

ABSTAT	\$279
AUTOCAD	\$349
GRAPHICS	\$229
BPS BUSINESS	\$229
CHARTMASTER	\$229
CHARTART	\$169
ENERGRAPHICS	\$199
EXECUTION	\$259
GEM DRAW	\$ 99
GRAPHWRITER	\$259
COMBO	\$259
MS CHART	\$159
OVERHEAD	\$129
ESPIRESS	\$129
PC DRAW	\$249
PC PAINTBRUSH	\$ 99
PC PAINT	\$ 79
PC GRAPH	\$ 99
SIGMASTER	\$195
STATGRAPHICS	\$595
STATPAK-NWA	\$329
STATPAK	\$349
WALONICK	\$419
SYSTAT	\$419

Professional Development

EXPERTEDGE	\$349
LIGHTYEAR	\$329
MANAGEMENT EDGE	\$159
HERCULES COLOR	\$119
CARD	\$119
PARADISE MODULAR	\$119
GRAPHICS	\$119
PARADISE	\$119
MULTIDISPLAY CARD	\$295
PERSYST BOB	\$429
PRINCETON SCAM	\$199
DOUBLER	\$529
SIGMA COLOR 400	\$129
STB CHAUFFER	\$129
BTR GRAPHICS	\$309
PLUS II	\$309
TECMAR GRAPHICS	\$489
MASTER	\$399
TEUNG ULTRA PAK	\$349
TEUNG ULTRA PAK-S	\$349

Hardware*

Accessories	
CURTIS SURGE	\$349
PROTECTORS	\$349
DATASHIELD BACKUP	\$349
GILTRONIX A/B SWITCH	\$349
MICROBUFFER INLINE	\$349
INRAPI	\$349
INRAPI	\$349

Multifunction Boards

AST ADVANTAGE	\$349
AST B PAK PLUS (84K)	\$259
AST B PAK PLUS (384K)	\$299
ORCHID BLOSSOM	\$309
(8K)	
ORCHID BLOSSOM	\$299
(384K)	
ORCHID PC TURBO	\$399
PERSYST TIME SPECTRUM	\$209
(8K)	
PERSYST TIME SPECTRUM	\$209
(384K)	
QUADBOARD (8K)	\$229
QUADBOARD (384K)	\$299
TECMAR CAPTAIN	\$199
(8K)	
TECMAR CAPTAIN	\$299
(384K)	
TECMAR JR CAPTAIN	\$329
(128K)	
TECMAR JR WAY (84K)	\$249
TECMAR MASTER	\$349
TECMAR WAY (84K)	\$349

Display Boards

EVEREX GRAPHICS	\$329
EDGE	\$329
HERCULES GRAPHICS	\$299
CARD	\$299
HERCULES COLOR	\$119
CARD	\$119
PARADISE MODULAR	\$119
GRAPHICS	\$119
PARADISE	\$119
MULTIDISPLAY CARD	\$295
PERSYST BOB	\$429
PRINCETON SCAM	\$199
DOUBLER	\$529
SIGMA COLOR 400	\$129
STB CHAUFFER	\$129
BTR GRAPHICS	\$309
PLUS II	\$309
TECMAR GRAPHICS	\$489
MASTER	\$399
TEUNG ULTRA PAK	\$349
TEUNG ULTRA PAK-S	\$349

Emulation Boards

AST	\$349
CS 3225 Plus	\$399
IRMA	\$399
IRMA	\$399
IRMA	\$399

Networks

AST PC NET	\$349
CORVUS NET	\$349
ORCHID PC NET	\$349
3C	\$349

Displays

AMC 330A	\$199
PRINCETON MX-12	\$899
PRINCETON MAX-12E	\$149
PRINCETON SR-12	\$169
PRINCETON MX-12E	\$149
QUADRAM	\$149
AMBERCHROME	\$179
TALAN 122 AMBER	\$155
AXMIN 420/440	\$399
ZENITH 124 AMBER	\$145
ZENITH 135 COLOR	\$349

Modems

AST REACH 1200	\$389
HAYES 1200	\$389
HAYES 1200B	\$389
HAYES 2400	\$639
VENTEL 1200	\$349
HALF CARD	\$349

Mass Storage/Backup

ALLOY M75 TAPE (EXT)	\$895
CORE SAM (AT)	\$395
IONEMGA BERNOLLI	\$395
BOX	\$295
IRWIN 210A 10MB TAPE	\$895
(EXT)	\$895
SYGEN IMAGE	\$995
TALL CASES TSG625	\$249
TECMAR OIC-60H TAPE	\$149
(EXT)	\$149
TECMAR OIC-60AT TAPE	\$1199
(INT)	\$1199

Printers/Plotters

C. ITO	\$349
DIABLO	\$349
EPSON FX-80+	\$349
EPSON FX-100	\$349
EPSON LQ-1550	\$999
PRINTER	\$349
NEC P3	\$179
NEC 360	\$179
OKIDA	\$349
PANASONIC	\$349
QUINE SPRINT 1155	\$1199
TOSHIBA P1340	\$629
TOSHIBA P301	\$1279

Input Devices

RETHRONIC 5151	\$179
KGALL	\$349
MICROSOFT MOUSE	\$139
PC MOUSE W PAINT	\$159

*CALL FOR SHIPPING COSTS

Harvard HTPM \$259	Chart Master \$229	Quadboard 384K \$269	Tseng Ultra Pak \$399	Smartmodem 1200B \$365	Smartmodem 2400 \$639
---------------------------------	------------------------------	-----------------------------------	------------------------------------	-------------------------------------	------------------------------------



LOWEST PRICE GUARANTEE!!

We will match current nationally advertised prices on most products. Call and compare.

free!

Diskette Library Case with your order



1-800-221-1260

In New York State call (718) 438-6057

TERMS:

Checks—allow 14 days to clear. Credit processing—add 3%. C.O.D. orders—cash. M.O. or certified check—add \$3.00. Shipping and handling UPS surface—add \$3.00 per item (UPS Blue \$6.00 per item). NY State Residents—add applicable sales tax. All prices subject to change.



MON.-THURS. 9:00AM-8:00PM
SUN. & FRI. 9:00AM-4:00PM

Softline
Softline Corporation
P.O. Box 729, Brooklyn, N.Y. 11230
TELEX: 421047 ATLNU I

LETTERS

Latest On-Line from FDA

Thank you for featuring the FDA's electronic bulletin board in Marty Porter's article "Tapping into the FDA," (*PC Magazine*, Volume 4 Number 14). After the article appeared, ITT-Dialcom lowered the monthly minimum for the bulletin board from \$100 to \$25—a change the



FDA has been advocating for some time.

Also, Porter noted the potential confusion regarding the Urgent file, which calls users' attention to any new items added to a file that is updated on an irregular basis. To avoid confusion we now call it the Latest file. The FDA press office puts out approximately two press releases and four Answers files a month, so the Latest file saves users from constantly scanning for new material. The Latest file contains only one or two lines of text directing users to check News or Answers files for the full text.

Porter also reports that some items on the News file are several days old. As a matter of policy, we put press releases on the News file the moment they are issued and keep them there for 1 month (for the convenience of subscribers who don't check the system every day).

Carolyn Laubach
Food and Drug Administration
Rockville, Maryland

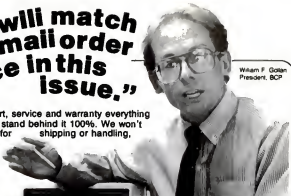
How to Write to PC Magazine

Do you have a comment, compliment, or criticism about something you've read in *PC Magazine*? A question you'd like to open up to other readers? Send it to Letters to PC Magazine, *PC Magazine*, One Park Ave., New York, NY 10016. We are not able to answer letters personally.

All letters become the property of *PC Magazine* and may be subject to editing. We cannot print letters that do not include a name and an address. ■

**"We will match
any mail order
price in this
issue."**

We'll support, service and warranty everything we sell and stand behind it 100%. We won't charge you for shipping or handling, nor will we penalize you for using a credit card.



William F. Gotsch
President, BCP

MODEMS

D.C. Hayes		Pro 1200B w/c	Real-Vad
Smartmodem 1200	364.95	Maxwell 1200 w/c	
Smartmodem 1200B w/c	354.95	Maxwell 1200B w/c	
Smartmodem 2400	504.95	Maxwell 2400 w/c	
Tigart 1000 w/28K	299.95	Maxwell 2400B w/c	
Prometheus			

PERIPHERAL CARDS & ACCESSORIES

ADVERTISING			PUBLICATIONS		
Advantage #284	360.00	S-Pac #546			
Advantage #P2 #10	110.00	S-Pac #354A			
8 Pac # #2 #14K	340.00	Mod Graphic #			
6 Pac # #5K #384	300.00	Mail Display			
Cable Ads			Payroll Com		
	34.00	Mail # #354			
Emerald	30.00	Color #384A			
Ruby	39.00				
PC Passport	34.00				
Grand Stand	34.00	Ad Quoting #1216			
Guest Spots	11.00	Guest Spots			
Command Cnt	14.00	MacroStar #1216			
Static Mail	60.00				
Direct			Questions		
Bonus \$500	12.00	New Exp #546			
Bonus \$2500	19.00	New Exp #384A			
Master MD 1 \$3500	20.00	Gold #546			
Master MD 2 \$2500	20.00	Gold #4036			
	20.00	Silver #546			
		Silver #384A			

■ BUSINESS SOFTWARE

Action-Tale		Marinucci	
Class B Framework	379.95	Clapper	479.95
Compuserve	379.95	Peachtree	
Spacetrk Kit	21.95	A/R	329.95
Subscriptions	44.95	B&K	219.95
Consumer		Back to Basics	
Audiotape 2	95.95	A/R	359.95
Doc James		OS	359.95
Market Anal	199.95	A/R	359.95
Market Mng	149.95	OS	359.95
Search Link	4.95	OS	359.95
GMP		Share Analysis	
CPA		Software Group	
Harvard	369.95	Enables	344.95
Harvard Bus		Software Publishing	
InfoComm	284.95	PCS File	79.95
Comshare		PCS Report	79.95
		PCS Graph	79.95
Lotus		Summa/US	
I 2 3	209.95	SuperCalc II v 2.0	194.95
Tk-Solver	209.95	SuperProject v 2	194.95
Meca		USAR	294.95
Ming Tour 5	104.95	USAR	294.95
Microtron		USInventory	294.95
R Base 5000	359.95	USOr-Entry	294.95
IBM 486/50	134.95		
Chart	169.95	Trigler	269.95
Project	149.95	In House Audit	109.95
Multiplan	119.95	Ability	269.95

■ UTILITY & LANGUAGE

SOFTWARE			
Address/Version	Quick Code	Price	
Baseband			
Scholar CD	88 95		149 95
Scholar NCP	40 95	Mac+	37 95
Superway	39 95	Plusword+	34 95
Turbo Pascal 3.0	40 95	Rebase+	34 95
Turbo Tool	35 95	PC Pentium	66 95
Turbo Graphics	34 95		
Camera/Power			
Copy II	25 95	Spotlight	419 95
Chromatization Research	22 95	Basic Inter	205 95
PhD	135 95		
Diagram Maker	228 95	Complan	274 95
Digital Research			
Gem Compiler	144 95	C Fontan	216 95
Gem Desktop	34 95	Color 2.0	494 95
Gem Drive	35 95	Macros Assistant	154 95
PassPort II	239 95		
BasicComp	429 95	Microsoft	99 95
C Basic Comp	339 95	Remake	99 95
Prolog 77.1	271 95	North Atlantic	99 95
Dr. Drive	179 95	Prokey 4.1	75 95
Dr. Graph	179 95		
Engineering Research			
Energygraphs - Pro	249 95	Summit	124 95
Sp3 Dollar	145 95		
Graph III	145 95	Ultimate	

PRINTERS

Citizen MSP 10	264.85	Gemini SR 15	
Citizen MSP 15	424.85	NEC P2 3	
Citizen MSP 20	424.85	NEC P5	
Citizen MSP 25	544.85	NEC 2050	
Epson LX 80 FT	279.85	NEC 2560	
Epson FX 85	259.85	NEC 6650	
Epson FX 195	489.85	Okidata 502	
Epson LQ 1500	889.85	Okidata 505	
Epson SQ 2000 Ink Jet	1539.85	Okidata 84	
Gemini SG 10	236.85	Tohyo P1340	
Gemini SR 10	489.85	Tohyo P351	

SOFTWARE

Broderbund		Spiralrite Software	
Base 35 Writer	49.95	Wordperfect 4.0	
Living Wordtext		Storm On Line	
Think Tank	99.95	Homeword	
Microprose		Homeword Speller	
Easy	94.95	Software Publisher	
Wordstar Pro	254.95	PFS Write	
Wordstar 2000	254.95	PFS Prool	
Wordstar 2000 +	294.95	Screen/Write	
Microsoft		Easywriter II	
Word	229.95	Easywriter II Sys	
Multimate Int'l.			

GAME & EDUCATIONAL SOFTWARE

SOFTWARE			
Davidson Assoc.			
Math Drill	34.95	Softice Ace	24.95
Speed Reader II	45.95	F-15 Fighter	24.95
Spell II	34.95	Solo Flight	34.95
Word Attack	34.95	Flight Simulator	34.95
Hayden		Microsoft	
Holy Goal	34.95	Starbrough	
Sargon III	34.95	Mastertype	27.95
Human Edge		Run for \$	27.95
Mind Probe	34.95	Bottom Drive	49.95
Millenrose		Songwriter	27.95
		Net Worth	27.95

BUSINESS COMPUTERS **FREE SHIPPING**
OF PETERBOROUGH CONTINENTAL
COMPUTER CO., INC. USA/INPS ONLY

766 RT 101 W • PO Box 772 • Peterborough NH 03458

APPRO VISA
QUESTIONS 800-845-3003
800-845-3003

DISK WORLD! is proud to introduce the lowest-priced, LIFETIME-WARRANTY diskettes ever!

And they're BRAND NAME PRODUCT to boot!

5.25" SSDD → .69 ea. 5.25" DSDD → .79 ea.

5.25" DSDD-HD → \$2.25 ea.

3.5" SSDD → \$2.09 ea. 3.5" DSDD → \$2.55 ea.

Based on multiples of 100 each.
Boxed in 10's with heavy-duty cardboard sleeve, user ID labels,
reinforced hubs (where appropriate) and write-protect tabs.

Introducing Wabash Pinnacle Series Diskettes.

Two years ago, if you told me I'd be writing this ad, I would have laughed.

At that time, Wabash diskettes were synonymous with "5-1". Just saying that quality control was poor would be charitable.

So much was wrong that DISK WORLD wouldn't sell them.

That was yesterday.

Keamey-National Inc., a \$202-million division of a much larger company, came into Wabash. Out went the old management, the old methods, the old production techniques... and in went a lot of new people, ideas, production lines and some really imaginative thinking.

The end result.

Today, I'm proud to offer you the Wabash Pinnacle Series of diskettes at the prices shown.

This isn't evolution in diskette manufacturing; it's revolution.

Here's what you get.

- Wabash Pinnacle diskettes are
 - certified 100% Error Free
 - are covered by a LIFETIME WARRANTY
 - meet or exceed all industry specifications (by quite some distance)
 - and are simply the best value in diskettes available today.

The torture test.

Considering Wabash's earlier dubious reputation, I wasn't exactly a true believer when their Director of Marketing came into my office with samples.

So I took a box at random, selected a disk, bent the thing every which way and slipped it into my IBM-PC. It formatted. It booted. It stored and retrieved data.

That wasn't enough.

I gave samples of the diskettes to Curt Rostenbach and, in turn, to Tom Street, both fellows of long experience and members of the Wabash (Illinois) Apple Users Group.

Tom really went to it. He took a quartz-halogen lamp, aimed it at the diskette until it started to smoke (and melt), and then formatted, booted the diskette and stored and retrieved data.

The same torturous (and intentionally mutilated) diskette ran on an AT, Corona and IBM. Curt was sear.

He simply bent the diskette every which way... and it still formatted, booted and ran on his Apple.

The best buy I've ever seen.

DISK WORLD!, Inc. sells more flexible magnetic media by mail-order than anyone else in the world.

I, as President of the corporation, won't tolerate a product with a failure rate of more than 1/1000th of 1 percent. I also don't like companies who try to make a "quality" or "premium" image for a higher price like Dysan and Verbatim did... until they failed.

As President of DISK WORLD!, Inc., my motto is simple: "The best diskettes for the least amount of money."

Wabash is it.

Right now, there is no better value than the Wabash Pinnacle Series of diskettes.

Granted, you have to buy a hundred at a time, but so what? Split the order with friends, relatives, co-workers or even your worst enemies.

The key thing is to get the most diskette for the money. And this is it.

(Incidentally, as a corporation, we put our money where our



mouth is. Our first order for Wabash Pinnacle Diskettes was 1.5 million units.)

That's an awful lot of faith and confidence. But, then again, I have the diskettes from Tom Street literally mailed... and kept on running.

The truth about \$1.00 or less diskettes.

More and more ads are popping up offering diskettes for \$1.00 or less.

By the same token, more and more people who were selling used cars a few months ago are now selling diskettes by mail.

We did a little survey of current ads for diskettes advertised for a dollar or less and did some analysis of the market and here's what we found as it applies to 5.25" DSDD diskettes "supposedly" selling for a dollar or less.

VENDOR	ADVERTISED		ACTUAL	ACTUAL
	LOW PRICE	PER 100	PRICE	WARRANTY
Unitech	99 ea.	92 ea.	Unspecified	Unspecified
Datamax	99 ea.	92 ea.	Unspecified	Unspecified
Computer Club	95 ea.	96 ea.	Unspecified	Unspecified
	99 ea.	1.02 ea.	Unspecified	Unspecified
Communications & Electronics	49 ea.	80 ea.	Unspecified	Unspecified
Precision Data	89 ea.	93 ea.	Unspecified	Unspecified
Diskette Connection	92 ea.	92 ea.	Unspecified	Unspecified
Comp Soft Serv	77 ea.	77 ea.	Unspecified	Unspecified
		- 99 ea.	Unspecified	Unspecified
Computer/Computer	99 ea.	99 ea.	Unspecified	Unspecified
DISK WORLD	89 ea.	92 ea.	Wabash	Datamax

The real truth about \$1.00 or less diskettes.

It costs all diskette manufacturers about the same to produce a diskette. Some may charge more because they want to project a "premium quality" image, via this late, lamented Dysan who bought their basic media from 3M.

Some charge less because they sell a sub-standard product... and we're not foolish enough to name names here. But here's the truth about the \$1.00 or less diskette market: it falls into four categories.

1. The DISK WORLD! of the universe who simply are so big that they can buy first quality product in massive quantities and charge the savings to you. (Precision Data and Diskette Connection on BRAND NAME products also fall into this category.)

2. The people who buy "cosmos" stuff from major manufacturers that usually hits quality control standards, but is cosmetically blemished and thus can't be packaged and sold under the manufacturer's own name.

3. "Duplicate Quality." Unidentified media, usually below manufacturer's own standards and frequently below ANSI and IBM standards. Sold on an "as-is" basis with the understanding that the manufacturer's name will never be divulged. Usually about a 20% reject rate... as compared to DISK WORLD's standard of less than 1/1000th of 1% reject/return rate. Next to garbage, this is the source of most diskettes advertised at a dollar or less.

They may work... and then again they may not. (Frankly, the odds at the blackjack table in Las Vegas are more in your favor.)

4. Garbage. Stuff that shouldn't be sold at all. But some manufacturers are hurting for cash, so they sell it anyway. (After all, they want to make their payroll. Look what happens when you don't you become a Dysan or Verbatim. Lots of history, but no money.) More and more garbage is being dumped into the market as manufacturers become pressured for cash and are motivated into selling anything and everything they can manufacture. (Read the article in FORBES about Verbatim and its "BONUS" brand.)

Finally, the Taiwanese counterfeiters are moving into the act. Perfect duplicates of the packaging of major manufacturers with one exception: the quality isn't there.

The Critical Factor.

Only DISK WORLD!, Inc. offers fully brand identified, LIFETIME-WARRANTY product for less than a dollar.

Every one else offering 5.25" product for less than a buck doesn't tell you who makes it.

We do.

And that ought to tell you a lot right there.

Ordering & Shipping Instructions

SHIPPING: Wabash Pinnacle Diskettes are sold in multiples of 100 only. Shipping charges are \$3.00 per 100, regardless of type or size.

PAYMENT: VISA, MASTERCARD and PREPAID orders accepted. Corporations rated 3A2 or better and government and quasi-government open accounts are accepted on a NET 15 basis.

C.O.D. orders are subject to a \$5.00 special handling charge. (Sorry for the increase, but too many people have been refusing C.O.D. orders or using bad checks. It's a classic example of a few "bad eggs" making life more expensive for everyone else.)

APO, FPO, AK, HI & PR ORDERS: include shipping as shown and an additional 5% of the total amount of the order to cover P&H and insurance.

No other non-continental U.S. orders are accepted. TAXES: Illinois residents only, add 7%.

Minimum Order \$35.00

All orders subject to acceptance.

Not responsible for typographical errors.

ORDERS ONLY:

1-800-621-8627

(In Illinois: 1-312-256-7140)

INQUIRIES & INFORMATION

1-312-256-7140

FOR FASTEST SERVICE,

USE MAIL:

Just address "DISK WORLD!"

(24-hour shipping on any item in stock)

(if you order via MAIL.)

DISK WORLD!, Inc.

629 Green Bay Road
Wilmette, Illinois 60091

Have you gone as far as you can with your current PC software?

Let's face it. Most popular IBM PC/AT/XT software is designed to solve fairly simple problems. Such as spreadsheet analysis and word processing. But the more you use it, the more you find yourself trapped by what it won't let you do. You need more sophisticated software. Software centered around powerful database management. So you can get more work done. Software that lets you build an entire system around it. Or link your PC to your mainframe. If you need to. Software backed by a Fortune 100 name. To make sure you continue to get the support you need. Well, now you can have it.

Software for Your Future

Now, for the first time, Martin Marietta Data Systems, a leader in information technology, is making its remarkable ITSoftware™ and RAMIS® II/PC product lines available to you through The MERIT Software Society. This software goes beyond decision support and moves into the next generation of serious data processing. Separating the database from the applications software, it lets you add more power and function to your PC-based system than you ever thought possible. And what software:

KeepIT™, a powerful database manager called "outstanding" and a "hard-to-beat value" by the Computer Buyers Guide and Handbook.

CalcIT™, a unique 3-D spreadsheet program that turns your spreadsheets into data cubes. PC Magazine calls this amazing program a "solid product" that "offers something that none of the other four spreadsheets even attempts."

WritIT™, our version of the famous Multimate™ word processing system that lets you automatically insert data or calculations created by your other software.

Plus thirteen more of the most sophisticated programs you'll find anywhere. And trained telephone support representatives you can call whenever you need help. Buy one program, or integrate

several into a software solution that will meet your needs for years to come.

Try It Before You Buy It

Yes, now, by joining The MERIT Software Society, you and your colleagues can actually test out PC software before you buy it. Software previously used almost exclusively by major corporations and government agencies. If you are not satisfied with your selection, return it within 30 days, and you pay nothing. You need never regret another software purchase again.

MERIT Software Society Membership Benefits

For only \$15.95, Society membership offers you:

- ☐ FREE TryIT software package to test the core ITSoftware program on your own IBM PC/AT/XT
- ☐ 30 day FREE trial of all software programs
- ☐ Major discounts from list prices
- ☐ Volume discounts on purchases of 5 or more of the same program
- ☐ A \$15.95 discount coupon
- ☐ A MERIT Software Information Kit
- ☐ A MERIT Card service expeditor with your personal ID

Membership Fee Only \$15.95 (Applied Toward Purchase)

Your \$15.95 membership fee is applied in full towards your first software purchase when you use your discount coupon. And there is no minimum purchase or buying requirement with The MERIT Software Society. Join now. And sample the software of the future today.

Dial 1-800-MERIT-99 to join The MERIT Software Society today!

Yes! I want to join The MERIT Software Society.

Name _____ Title _____

Company _____ Telephone _____

Address _____

City _____ State _____ Zip _____

☐ My check for \$15.95 is enclosed.

Charge my \$15.95 membership fee to my (check one):

☐ VISA ☐ MasterCard ☐ American Express

Account No. _____ Exp. Date (mo./yr.) _____

Signature _____

The MERIT Software Society

Martin Marietta Data Systems 6103 Ivy Lane, Greenbelt, MD 20770

MARTIN MARIETTA



COMPUTER HUT

COMPARE
OUR
SERVICE & PRICE!

SPECIAL OF THE MONTH

IBM-PC, XT & AT
CALL FOR
PRICE



COMPAQ®

DISK DRIVES

Tandon TM100-2 DS/DD	\$159
MATSUSHITA JA 551	\$139
TEAC FD-55B Slimline	\$139
IBM drives w/Logo	\$169

HARD DISKS/TAPE

ITE MAYNARD ELECTRONICS	
WSO.....\$695 WSI.....	\$795
20/30 Meg H.D. with Cont.	CALL
Mayn Stream Tape Backup	CALL
IOMEGA	
Bernoulli Box 20 Meg.....	\$2595
ALLOY.....	CALL

ADD-ON BOARDS

QUADRAM	
Quadboard 64K exp. to 384K.....	\$269
Quad 512+ 64K.....	\$239
AST RESEARCH	
SixPak Plus 64K.....	\$269
I/OPlus II.....	\$129
Advantage 128K.....	\$409
TECMAR	
Graphics Master.....	\$489
MAESTRO.....	CALL
HERCULES	
Hi Res Mono Graphics.....	\$319
Color Graphics w/Par Port.....	\$185
PARADISE	
Modular Graphics.....	\$275
5-PACK OK.....	\$159
PERSYST	
Mono Card w/par port.....	\$195
Color Card.....	\$169

MODEMS



Smartmodem 1200.....	\$419
Smartmodem 1200B.....	\$379
Smartmodem 2400.....	\$649
NOVATION	
SmartCat.....	\$349

PRINTERS

EPSON

FX-80+.....	FX-100+.....
LX-80..... BEST	RX-100..... BEST
JX-80..... DEAL	LQ-1500..... DEAL
Hi-80 plotter.....	CALL

brother

HR-10.....	\$299
HR-15.....	\$389
HR-35.....	\$795
2024L.....	CALL

C-ITOH

PROWRITER.....	CALL
STARWRITER F-10P.....	\$995

OKIDATA

182P.....	84P.....
92P..... BEST	192P..... BEST
93P..... PRICES	193P..... PRICES
OKIMATE 20.....	

NEC

2050.....	\$699
8850.....	\$1595
Pinwriter P2 \$589	P3..... \$795

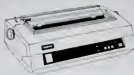
TOSHIBA

P351.....	\$1295
P1340.....	\$595

DAISYWRITER

2000 w/48K Buffer.....	\$849
------------------------	-------

ACCESSORIES..... CALL



ASK ABOUT OUR
TRAINING & REPAIR
SERVICES.

CIRCLE 114 ON READER SERVICE CARD

MONITORS

AMDEK

Video 300G.....	\$135
Video 310A.....	\$179

CGS

Mono Monitor w/tilt & swivel	\$159
------------------------------	-------

PGS

HX12 Hi Res RGB monitor.....	\$489
MAX-12 Hi Res Mono.....	\$189
SR-12 Super Hi Res RGB.....	\$599



SOFTWARE

WORDPROCESSING

MS Word.....	\$239
Multimate.....	CALL
Volkswriter Deluxe.....	\$159
PFS: Write.....	\$89
PFS: Proof.....	\$69
WordPerfect.....	\$269
WordStar 2000.....	\$289

DATABASE/INTEGRATED

dBase III.....	CALL
Quickcode III.....	\$179
RBase 4000.....	\$279
Clout 2.0.....	\$169
LOTUS 1-2-3 & Symphony.....	CALL
Framework.....	CALL

UTILITIES/COMPILERS

Crosstalk.....	\$109
SmartcomII.....	\$109
Sideways.....	\$49
Norton Utilities.....	\$59
Sidkick.....	\$45
Turbo Pascal.....	\$55
LIFEBOAT Lattice C.....	\$299
MS Basic.....	\$259
MS Fortran.....	\$239

BUSINESS

MICROSOFT Project.....	\$159
Chart.....	\$159
STAR Acct. Partner I & II.....	CALL
BPI SYSTEMS.....	CALL
PFS: File.....	\$89
PFS: Graph.....	\$89
PFS: Plan.....	\$89
Multiplan.....	\$129
Harvard Total Proj.....	\$309

OTHER

MasterType.....	\$35
Typing TutorIII.....	\$39
Flight Simulator.....	\$39
Managing your money.....	\$129

AND LOTS MORE

ANY PRODUCT NOT
LISTED? CALL

EAST COAST

COMPUTER HUT

OF NEW ENGLAND INC.
101 Elm St. Nashua, NH 03060

(603) 889-0666

For Orders Only — (800) 525 5012

CANADA

MICROCONTEXT

AUTHORIZED DEALER

4847 Ave Du Parc
Montreal Que H2V4E7

(514) 279-4595

MID-WEST

COMPUTER HUT INC.

524 S. Hunter
Wichita, Kansas 67207

(316) 681-2111

For Orders Only — (800) 572 3333

All products usually in stock for immediate shipment and carry full manufacturer's warranty. Price subject to change — this ad prepared two months in advance. You get the lowest price. We honor personal checks — allow 10 days to clear. COD up to \$300 add 2%. Visa, MasterCard add 2%. For shipping & insurance add 2% or \$6.00 min. for small items and \$12. min. for monitors, printers, etc. We accept company checks and P.O.'s from Fortune 1000 Companies.

IBM is a trademark of IBM Corp

Return authorization and order status call information line

75

InfoWorld on EasyLAN
 "Any product that brings
 down the cost and improves
 the ease of use for LANs is
 for the better."

Buy A Local Area Network For Less Than \$100 Per PC

STOP buying expensive duplicate PC peripherals. Usually your peripherals just sit idle. If your office owns two or more PCs can you justify a costly printer and multiple disk drives for each PC? How often are your printers actually busy? Thirty minutes a day? An hour a day? Even your expensive hard disk is used infrequently.

The obvious solution to avoid expensive duplicate peripherals is a local area network that allows you to share printer and disk drives. But until now LANs have cost in excess of \$1,000 per PC.

INTRODUCING THE *EasyLAN*™ OFFICE NETWORK

EasyLAN shares printers and disk drives between IBM PCs. *EasyLAN* can save you \$1000 or more per PC by eliminating duplicate equipment purchases. *EasyLAN* advantages:

- *EasyLAN* shares printers, disk drives, and information
- Easy to justify—less than \$100 per PC
- Easy to install
- Easy to operate
- Easy to order
- *EasyLAN* performs in the background.

EasyLAN's low price matches the small business user's cost-sensitive budget. It is the office network solution for less than \$100 per PC including cables and software. At this price, the RISK IS LOW, and the BENEFITS ARE HIGH.

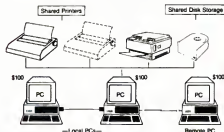
EasyLAN performs its operations concurrently in the background. *EasyLAN* communications, file transfers and printer operations all take place while each PC simultaneously performs such normal DOS applications as Lotus 1-2-3,™ WordStar™ and dBASE.™

EASY TO OPERATE

EasyLAN network software allows PC users to share printer and disk peripherals. PCs are connected by *EasyLAN* cables plugged directly into your PC's standard serial communication ports and *EasyLAN* can be used with digital PBXs. *EasyLAN* supports geographically separated PCs using modems and dial-up lines.

EasyLAN's performance meets your small office requirements to move word processing documents and spread sheets between PCs. For example, *EasyLAN* can move a 10 page document between two PCs, as a background operation, in less than one minute!

EasyLAN loads automatically at boot time. It manages the PC's serial and parallel ports for



EasyLAN Office Network

communications and printing. All *EasyLAN* operations may be started from any connected PC.

Printer sharing operates transparently with existing programs. Print files are automatically written to disk and scheduled for printing. Multiple printers per PC may be designated for specific office tasks.

For example, one PC can interface with Printer 1 for general purpose output, with Printer 2 for continuous-form letterhead stationery, and with Printer 3 for printing continuous-form invoices.

Disk sharing uses *EasyLAN*'s COPY command, *EZCOPY*,™ to move files to and from PCs. Files are stored or retrieved from disk storage and the Directory is updated. The high-capacity benefits of just one hard disk can now be shared by several PCs.

All communication operations are protected by a unique password assigned to each PC so security is maintained.

EASY SPECIFICATIONS

Each PC in the network requires an individual copy of the *EasyLAN* software, 128k of memory, a serial communication port(s), and DOS 2.0 or above. For your convenience, *EasyLAN* diskettes are not copy protected. *EasyLAN* runs on all IBM PC models (PC, XT, AT, and Jr) and compatible PCs.

"I look for those products that make my job easier and save me and my company money. I believe *EasyLAN* does both."
 Carl Warren
 Editor, *Micro Systems*

EASY TO INSTALL

EasyLAN can be installed in less time than it takes to enjoy your coffee break. Just plug the *EasyLAN* cables into existing serial ports. *EasyLAN*'s PRINT, COPY and DIRECTORY commands are very similar to DOS commands.

EASY TO ORDER

EasyLAN is immediately available and easy to order. For a two PC network, start with the *EasyLAN* Kit. For additional PC in the network, order the *EasyLAN* Expansion Kit.

The *EasyLAN* Kits include program diskettes, manuals and cables, which are shielded to maintain signal quality. All parts are warranted for one year. *EasyLAN* program diskettes may be purchased individually; you supply your own cables, modem links or PBX connections.

ORDER *EasyLAN* TODAY. 1-800-835-1515

Server Technology, Sunnyvale, CA 94086 408/738-8377

Name _____		Qty _____	Amount _____
Shipping Address _____			
City _____			
State _____ Zip _____			
Telephone (____) _____			
Payment: USA—Visa, MC, Check, PO No COD			
Out of USA—US \$ Bank Draft			
Name on Credit Card _____			
Credit Card No. _____			
Card Expire Date _____			
EasyLAN Order Form			
<i>EasyLAN</i> Kit—for 2 PCs:			
One 30' Cable, Two Diskettes, and Manuals.		Price \$179.95	\$ _____
<i>EasyLAN</i> Expansion Kit—for each additional PC:			
One 30' Cable, Diskette and Manual.		Price \$109.95	\$ _____
<i>EasyLAN</i> Diskette and Manual.		Price \$ 79.95	\$ _____
<i>EasyLAN</i> Cable—30'		Price \$ 49.95	\$ _____
Custom length cables. Call for quote.		CA resident tax 7%	\$ _____
		Shipping Charge: USA \$5.00	\$ _____
		Out of USA \$15.00	\$ _____
TOTAL ORDER			\$ _____

For Ordering or Configuration Help Call Toll Free

1-800-835-1515

In California call 408/738-8377 MasterCard and Visa Accepted

1066 E. Duane, S107
 Sunnyvale, CA 94086
 408/738-8377

EasyLAN

THE CMO ADVANTAGE

- ✓ THE BEST PRICES!
- ✓ Next day shipping on all in stock items.
- ✓ Free easy access order inquiry.
- ✓ Orders from outside Pennsylvania and Nevada save state sales tax.
- ✓ Free technical support with our factory trained technical staff.
- ✓ There is no limit and no deposit on C.O.D. orders.
- ✓ There's no extra charge for using our credit card. Your card is not charged until we ship.
- ✓ No waiting period for cashiers checks.
- ✓ We accept purchase orders from qualified corporations. Subject to approval.
- ✓ Educational discounts available to qualified institutions.
- ✓ FREE CATALOG MEMBERSHIP

ORDER LINE

1-800-233-8950
In PA 1-800-242-4215
CUSTOMER SERVICE & TECH SUPPORT
1-717-327-1450

Dept. B110

MAILING ADDRESS

Computer Mail Order
Dept. B110
477 East Third Street
Williamsport, PA 17701



MEMBER DIRECT MARKETING ASSOCIATION

CREDIT CARDS



SHIPPING

Add 3%, minimum \$5.00 shipping and handling on all orders. Larger shipments may require additional charges.

All items subject to availability and price change.

Returned shipments may be subject to a restocking fee.

CANADIAN ORDERS

1-800-268-3974
Ontario/Quebec

1-800-268-4559
Other Provinces

1-416-828-0866
In Toronto

TELEX: 06-218960

2505 Dunwin Drive,
Mississauga, Ontario
Canada L5L1T1

All prices shown are for U.S.A. orders.

Call The Canadian Office for Canadian prices.

DRIVES

HARD

ALDY

PC Stor.....	CALL
PC Disc.....	CALL
PC QC-Stor.....	CALL
PC Back-Up.....	CALL

I/O ASSOCIATES

5 meg Removable/Internal.....	\$1399.00
10 meg Fixed/Internal.....	\$1249.00
15 meg 5 Removable/10 Fixed.....	\$2149.00
25 meg 5 Removable/20 Fixed.....	\$2499.00

I-MEGA

10 meg Bernoulli Box.....	\$2099.00
20 meg Bernoulli Box.....	\$2599.00



12, 25, 35, 50, 60 meg. (PC)	from \$1499.00
------------------------------	----------------

FLOPPY

Tandon

320K 5 1/4".....	\$119.00
------------------	----------

TEAC

320K 5 1/4".....	\$109.00
------------------	----------

MODEMS

ANCHOR

Volkmodem 300/1200.....	\$189.99
Mark XII (1200 Baud).....	\$259.00
Signalman Express.....	\$299.00
Lightning 2400 Baud.....	\$399.00

HAYES

Smartmodem 300.....	\$139.00
Smartmodem 1200.....	\$359.00
Smartmodem 1200B.....	\$359.00
Smartmodem 2400.....	\$429.00
Smart Com II.....	\$89.99
Chronograph.....	\$199.00
Transet 1000.....	\$309.00

AST

Reach 1200 Baud Half Card.....	\$399.00
--------------------------------	----------

NOVATION

J-Cat.....	\$99.99
Smart Cat Plus.....	\$319.00
Novation 2400.....	CALL

QUADRANT

Quadmodem II.....	
300/1200.....	\$339.00
300/1200/2400.....	\$499.00

INTERFACES

PARADISE

Microbuffer.....	from \$199.00
------------------	---------------

QUADRANT

Microfazer.....	from \$139.00
Elazer (Epson).....	from \$79.99

DIGITAL DEVICES

Printer Buffer 16K.....	\$74.99
-------------------------	---------

GRAPHICS

KOALA

Koala Pad w/Micro Painter.....	\$89.99
--------------------------------	---------

MICROPHONICS

Pronounce.....	
Speech Input System.....	\$499.00

PARADISE

Patent.....	\$1299.00
-------------	-----------

MONITORS

AMDEK

300 Green.....	\$129.00
300 Amber.....	\$139.00
310 Amber IBM-Plug.....	\$179.00
Color 300 Composite.....	\$189.00
Color 500 Composite/RGB.....	\$389.00
Color 600 Hi-Res (640x240).....	\$399.00
Color 700 Hi-Res (720x240).....	\$499.00
Color 710 Long Phosphor.....	\$579.00
Color 722 IBM Enhanced.....	\$579.00

NAD

12" Amber/Green TTL (ea.).....	\$119.00
--------------------------------	----------

NEC

JB 1260 Green.....	\$59.99
JB 1201 G/1205A..... (ea.)	\$89.99
JB 1270.....	\$139.00
JB 1275.....	\$149.00
JB 1280 G TTL/1285 A TTL (ea.)	\$289.00
JC 1480 Color.....	\$289.00
JC 1410 RGB.....	\$689.00

PRINCETON

MAX-12E Amber.....	\$189.00
HX-9" RGB.....	\$489.00
HX-9E Enhanced.....	\$519.00
HX-12 12" RGB.....	\$489.00
HX-12E Enhanced.....	\$559.00
SR-12 Hi-Res.....	\$599.00
SR-12P Enhanced.....	\$649.00

TAXAN

121 Green TTL.....	\$139.00
122 Amber TTL.....	\$149.00
420 Hi-Res RGB (IBM).....	\$429.00
440 Ultra Hi-Res RGB.....	\$499.00

QUADRANT

8400 Quadchrome.....	\$479.00
8410 Quadchrome II.....	\$489.00
8420 Amberchrome.....	\$179.00
8500 Quad Screen.....	\$1499.00

ZENITH

ZVM 1200/1200.....	\$99.99
ZVM 1240 IBM Amber.....	\$149.00
ZVM 131 Color.....	\$214.00
ZVM 133 RGB.....	\$429.00
ZVM 135 RGB/Color.....	\$459.00
ZVM 136 RGB/Color.....	\$599.00

DISKETTES

maxell.

3 1/2" SS/SD.....	\$39.99
3 1/2" DS/DD.....	\$54.99
5 1/4" MD-1 w/hardcase.....	\$15.99
5 1/4" MD-2 w/hardcase.....	\$23.99
5 1/4" MD-2 HD for AT.....	\$44.99

Verbatim.

5 1/4" SS/DD.....	\$21.99
5 1/4" DS/DD.....	\$29.99
Disk Analyzer.....	\$24.99

Densitron

Elephant 5 1/4" SS/SD.....	\$13.99
Elephant 5 1/4" SS/DD.....	\$15.99
Elephant 5 1/4" DS/DD.....	\$17.99
Elephant Premium DS/DD.....	\$23.99

IBM

5 1/4" DS/DD Poppy Disks (box of 10).....	\$27.99
---	---------

DISK HOLDERS

INNOVATIVE CONCEPTS

Flip-In-File 16.....	\$3.99
Flip-In-File 50.....	\$17.99
Flip-In-File 50 w/lock.....	\$24.99
Flip-In-File (400/800 RCM).....	\$11.99

AMARAY

50 Disk Tub 5 1/4".....	\$9.99
30 Disk Tub 3 1/2".....	\$6.99

PRINTERS

CANON

A40.....	CALL
LBP-5A1 Laser.....	CALL

CITIZEN

MSP-10 (80 col).....	\$299.00
MSP-15 (132 col).....	\$429.00
MSP-20 (80 col).....	\$469.00
MSP-25 (132 col).....	\$599.00

CITICOR

Printer 7500.....	\$219.00
Printer 8510P.....	\$299.00
Printer 8510 NLQ.....	\$329.00
Printer 1550.....	\$449.00
Starwriter 10-30.....	\$459.00

CORONA

Lazer LP-300.....	\$2799.00
-------------------	-----------

DIABLO

D25 Daisywheel.....	\$549.00
600-109 Daisywheel.....	\$1749.00
D801F Daisywheel.....	CALL

daisywriter

2000.....	\$749.00
-----------	----------

EPSON

RX-100, LX-80.....	CALL
PX-85, FX-185.....	CALL
LQ 1500, iX80 Color.....	CALL
Homewriter 10.....	CALL
NEW! LX-90, SQ-2000, GX-10, DX-20, HS-90.....	CALL

JUKI

8000 Letter Quality.....	CALL
6100 Letter Quality.....	CALL
5300 Letter Quality.....	CALL

NEC

8027 Transportable.....	\$299.00
2000 Series.....	\$699.00
3000 Series.....	\$1099.00
8000 Series.....	\$1449.00
ELF 360.....	\$449.00

OKIDATA

92, 93, 182, 192, 193, 94.....	
2410, Okimate 20.....	CALL

OLYMPIA

Needlepoint Dot Matrix.....	\$299.00
Compact R0.....	\$339.00
Compact Z.....	\$369.00

Panasonic

KX1091.....	\$259.00
KX1092.....	\$389.00
KX1093.....	\$479.00

QUADRANT

Quadtet.....	\$399.00
Quadtet.....	CALL

SILVER-REED

500 Letter Quality.....	\$279.00
580 Letter Quality.....	\$419.00
770 Letter Quality.....	\$759.00

star

SB/SD/SQ/SR.....	CALL
Powertype Letter Quality.....	CALL

Texas Instruments

T1850.....	\$529.00
T1855.....	\$759.00
T1865.....	\$1049.00

TOSHIBA

1340 (80 Column).....	\$599.00
P351 (132 Column).....	\$1499.00

CALL TOLL-FREE

PARADISE
Multi-Display Card
\$199.00

AST
Six Pak Plus
\$209.00

SOFTWARE FOR IBM

GALEKA	MicroPro
Electronic Desk.....\$199.00	WordStar 2000.....\$239.00
ASHTON-TATE	WordStar 2000+.....\$269.00
Framework.....\$399.00	IBM PC ROM
dBASE II.....\$299.00	RtBase 4000.....\$249.00
dBASE III.....\$399.00	RtBase 5000.....\$399.00
Friday.....\$169.00	Cloud 2.0.....\$129.00

SOFTWORD	MICROSOFT
Turbo Pascal.....\$39.99	Flight Simulator.....\$39.99
Sidekick.....\$39.99	MultiPlan.....\$129.00
CENTRAL POINT	Microsoft Word.....\$229.00
PC Copy II.....\$29.99	Microsoft Project.....\$59.00
Continental Software	Microsoft Chart.....\$159.00
Home Accountant Plus.....\$49.99	Microsoft Mouse.....\$139.00
1st Class Mail.....\$79.99	MICROSTILE

DECISION RESOURCES	MarketMate
Chartmaster.....\$259.00	Multi Mate.....\$249.00
Signmaster.....\$179.00	

ELECTRONIC ARTS	INNOTION UTILITIES
Get Organized.....\$69.99	PeachPack (GLA/PIAR).....\$199.00
Cut & Paste.....\$39.99	Norton Utilities (IBM).....\$59.99
Music Construction.....\$29.99	IBM
One-on-One.....\$29.99	
Financial Cookbook.....\$34.99	

ENERGETHICS RESEARCH	Access
Energistics.....\$259.00	File/Write/Graph.....(ea.) \$79.99
	Report.....\$74.99
	Plan.....\$79.99

FUNK SOFTWARE	Professional Software
Sideways.....\$39.99	PC Plus/The Boss.....\$249.00
Harvard Software Inc.	RosSoft
Harvard Project Manager.....\$209.00	Pro Key.....\$89.99
Total Project Manager.....\$269.00	

Hayes	Human Edge™
Please (Data Base).....\$199.00	Communication Edge.....\$99.99
	Management Edge.....\$119.00
	Negotiation Edge.....\$139.00
	Sales Edge.....\$119.00

Amec	INFOCOM
PC Pantribush.....\$94.99	Witness.....\$29.99
	Enchanter.....\$29.99
	Pinnacle.....\$29.99
	Hitch Hiker.....\$29.99
	Cut Throat.....\$29.99
	Zork 1, 2, 3.....\$27.99
	Infidel.....\$29.99

Amec	Amec
PC Pantribush.....\$94.99	PC Pantribush.....\$94.99

Amec	Amec
PC Pantribush.....\$94.99	PC Pantribush.....\$94.99

Amec	Amec
PC Pantribush.....\$94.99	PC Pantribush.....\$94.99

Amec	Amec
PC Pantribush.....\$94.99	PC Pantribush.....\$94.99

Amec	Amec
PC Pantribush.....\$94.99	PC Pantribush.....\$94.99

Amec	Amec
PC Pantribush.....\$94.99	PC Pantribush.....\$94.99

IBM PC
IBM PC-II
IBM-XT
IBM-AT
SYSTEMS

Configured to your specifications.

Call for the price and availability of your system requirements.



ASST	CALL
Safari (7300).....\$6300	CALL

COMPAQ	CALL
Portables.....CALL	CALL
Desktops.....CALL	CALL

ITT	CALL
ITT X-TRA.....CALL	CALL
256K, 2 Drive System.....CALL	CALL
256K, 10 meg Hard Drive System.....CALL	CALL

SANYO	CALL
MBC 550-2 Single Drive.....CALL	CALL
MBC 555-2 Dual Drive.....CALL	CALL
MBC 775 Portable.....CALL	CALL
MBC 511 10 Meg.....CALL	CALL
675 Portable.....CALL	CALL
680 Desktop.....CALL	CALL

CORONA

PPC400 Dual Portable.....\$1299.00	
PPCXT 10 meg Portable.....\$1989.00	
PC40022 Dual Desktop.....\$1389.00	
PC400-HD2 10 meg.....\$1989.00	

ZENITH

PC-158-21 Single Desktop.....CALL	
PC-158-52 Dual Desktop.....CALL	
PC-158-53 10 meg Desktop.....CALL	
PC-161-21 Single Portable.....CALL	
PC-161-52 Dual Portable.....CALL	
2-200 (AT).....CALL	
171 (Portable).....CALL	
138 (Transportable).....CALL	
148 (Desk Top).....CALL	

ACCESSORIES

MEMORY CHIPS	CALL
4184 RAM Chips.....(ea.) \$1 79	CALL
128 RAM Chips.....(ea.) \$6 99	CALL
256 RAM Chips.....(ea.) \$9 99	CALL

KEYBOARDS	CALL
key tronic.....CALL	CALL
KB5150/KB5151/KB5151A.....CALL	CALL
KB5152B/KB5153/KB5148Jr.....CALL	CALL

KENNEDY	CALL
Master Piece.....\$99.99	CALL
Master Piece Plus.....\$119.00	CALL

CURTS	CALL
Side Mount SS-1.....\$19.99	CALL
Diamond SP-1.....\$39.99	CALL
Emerald SP-2.....\$44.99	CALL
Sapphire SPF-1.....\$59.99	CALL
Ruby SPF-2.....\$69.99	CALL

MULTIFUNCTION CARDS

AST	SEE SPECIAL
Six Pak Plus.....\$299.00	SEE SPECIAL
Mega Plus II.....\$299.00	SEE SPECIAL
IO Plus II.....\$139.00	SEE SPECIAL
Advantage - AT.....\$399.00	SEE SPECIAL
Graph Pak.....\$599.00	SEE SPECIAL
MonoGraph Plus.....\$399.00	SEE SPECIAL
Preview Mono.....\$299.00	SEE SPECIAL
PC Net Cards.....\$379.00	SEE SPECIAL
5251/11 On-line.....\$799.00	SEE SPECIAL
5251/12 Remote.....\$579.00	SEE SPECIAL
3780.....\$639.00	SEE SPECIAL
BSC.....\$499.00	SEE SPECIAL

PERSYST	CALL
Bob Board.....\$369.00	CALL

dca	CALL
IRMA 3270.....\$879.00	CALL
IRMA Print.....\$999.00	CALL

SEVEREX	CALL
Color Card (Graphics Edge).....\$299.00	CALL
Magic Card II.....CALL	CALL

HERCULES	CALL
Graphics.....\$299.00	CALL
Color.....\$159.00	CALL

IDEAL	CALL
IDEAmax - ZPR, 84K, C, S, P \$229.00	CALL
IDEAmini - YPR, C, S, P.....\$189.00	CALL
IDEAminimax - MPI 128K.....\$229.00	CALL
IDEAmax Software.....\$219.00	CALL
IDEA 5251.....\$699.00	CALL

MYLEX	CALL
The Chairman.....\$479.00	CALL

PARADISE	CALL
Modular Graphics Card.....\$279.00	CALL
Multi Display Card.....SEE SPECIAL	CALL
Five Pack C, S.....\$159.00	CALL

SIGMA	CALL
Color 400.....\$579.00	CALL

LEGAR	CALL
Captain - 64.....\$199.00	CALL
Captain Jr 128K.....\$279.00	CALL
Graphics Master.....\$469.00	CALL

QUADRAM	CALL
Quadport-AT.....\$119.00	CALL
Quadport-MT (128K).....\$349.00	CALL
The Gold Quadboard.....\$449.00	CALL
The Silver Quadboard.....\$239.00	CALL
Expanded Quadboard.....\$219.00	CALL
Quad 512+.....\$229.00	CALL
Liberty.....\$309.00	CALL
QuadPrint.....\$499.00	CALL
QuadLink.....\$399.00	CALL
QuadColor.....\$199.00	CALL
QuadVr Expansion Chassis.....\$499.00	CALL
Expansion Chassis Memory.....\$199.00	CALL
Chronograph.....\$79.99	CALL
Parallel Interface Board.....\$64.99	CALL

1-800-233-8950

CIRCLE 35 ON READER SERVICE CARD

COMPUTER MAIL ORDER

***Our computers not only
expand their configurations,***

**AVAILABLE IN
8088 and 80286
MODEL GROUPS**

***they expand your
profits.***

The PC/88. IBM Compatible in Performance & Quality. It's an advanced technology computer with 3 model groups that give you a broad range of price/performance options. You make more profit, no matter what quantity you sell.

Volume
Prices from **\$1,062**

The PC/286. 1/3 faster than an AT for 1/3 less. This is a high performance version of the PC/88 based on the 80286 (8 MHz) Micro-processor. You get 7 TIMES THE PERFORMANCE, 3 model groups & more profit. This is what the PC II could have been.

Volume
Prices from **\$1,670**

And, both come with our unmatched:

- **BIOS COMPATIBILITY
GUARANTEE***
- **ONE YEAR WARRANTY***

Interested? Give us a call. Today.
Gulfstream Micro Systems
800/443-0500
Telex 9103800112
5500 N. Federal Highway
Boca Raton, FL 33431



We're Products. We're Service. We're Support.

*GMS Guarantees This System To Be BIOS Compatible with the IBM PC/XT™ See Our Purchase Agreement For Details.

CIRCLE 319 ON READER SERVICE CARD

YOU'LL FIND A LOT MORE THAN PROMISES BEHIND THE TDK NO-RISK™ DISK.



Think for a moment about all the floppy disk advertising that's trying to program your buying habits. You hear one promise after another. Well, at TDK, we also make a lot of promises. But we back them with far more than transparent conversation.

Take for instance our proud position as the world's largest manufacturer of magnetic media. Over the past fifty years, our technological superiority and innovativeness have spawned what is today's state-of-the-art audio and video recording tape.

And, as you can imagine, everything we've learned over the years about oxide formulations, film bases...etc., has been invaluable in helping us perfect our disk technology. In fact, all our disks are made with such a wealth of expertise that they meet or exceed the most rigid industry standards.

Whether you choose our 8-inch, 5.25-inch High Density, 5.25-inch standard or 3.5-inch floppy disks, you'll be assured of absolutely flawless performance no matter how often they're used. We also offer a lifetime replacement warranty—an added assurance you'll probably never need.

So, if you're looking for a disk that offers the utmost in reliability, make yourself a promise. Don't risk your valuable information with anything less than the TDK No-Risk Disk.



THE NO-RISK™ DISK. TDK®

CIRCLE 227 ON READER SERVICE CARD



The rush to Revelation[®] has just begun.

When ordinary database management software isn't enough, enlightened users are switching by leaps and bounds to Revelation, the complete database and applications environment.

That's because Revelation includes powerful tools to create applications in no time. Plus advanced features that help users get the most from their system day in and day out.

For software developers, there's a powerful applications generator that builds files, fields, menus and reports.

For corporate users, Network Revelation is already off and running on

both IBM's[®] PC Network and any hardware running Novell NetWare.[™]

For hard-core programmers, Revelation's R/BASIC procedural language combines the best of BASIC with the structure and logic of C.

And for everyone, there's an advanced query language and report writer that's fluent in everyday English and eager to learn new expressions.

The secret is incomparable technology: variable-length fields to conserve precious disk space; unlimited files, fields and records; data dictionaries that make it easy to change your

database when you change your mind; plus a high-speed compiler to accelerate program execution. And, of course, conversion utilities for dBase II[®] and Lotus 1-2-3[™] are included at no extra cost.

Revelation isn't for everyone. But if you're ready for a database management system you'll never outgrow, rush to your nearby dealer.

Ask for an unforgettable demonstration of Revelation's superior capabilities.

IBM is a registered trademark of International Business Machines. NetWare is a trademark of Novell, Inc. dBase II is a registered trademark of Ashton-Tate. 1-2-3 is a trademark of Lotus Development Corporation.

COSMOS[™]

CIRCLE 218 ON READER SERVICE CARD

Cosmos, Inc., 19530 Pacific Highway S.

Seattle, WA 98188, (206) 824-9942

Unearthed Treasures

Norton always has more facts up his sleeve than what actually appears in the limited space of this column. Here's the spillover from previous columns on Microsoft Word and Hewlett-Packard's LaserJet printer.

One of the problems of writing this column is that I often have too many topics to cover and too little space in which to cover them. I always feel like I'm cheating you when I can't manage to pack in every fascinating and useful detail. Here are some of the interesting tidbits that never made it into other columns.

Lately, I've been singing the praises of *Microsoft Word*, and with good reason, but I haven't had the time to hit on every important aspect of the program. For starters, unlike most word processors, it is computer-intensive, and, as a result, it runs a little slowly at times. *Word* isn't slow because it's inefficient. On the contrary, it does so much more than the normal word processor that it needs more computer cycles. Even on the hottest machines around—an AT with a speeded-up crystal or a Compaq 286 in fast mode—*Word* can be slightly sluggish. On a stock PC with a graphics display card (IBM or Hercules), it's pretty bad. You can alleviate the problem by running *Word* in nongraphics character mode (/C option), but you sacrifice some graphics benefits.

If you're serious about word processing with *Word* and an AT or Deskpro is out of the question, you should obtain one of those "turbo" boards, such as the Orchid board, that can double or triple a PC's power. I also highly recommend that you use a Hercules graphics card and a mouse with *Word*.

Word's Version 2 manual is better than Version 1's, but it still has some major problems, such as its failure to ex-

plain how to do something if it's demonstrated on the tutorial disk. The tutorial program is terrific for learning *Word*, but you shouldn't have to fire it up just to check the program's fine points. By the way, an excellent reference book is Peter



Peter Norton

Rhinearson's *Word Processing Power with Microsoft Word*.

Taking It to the Limit

Another pet subject of mine is the Hewlett-Packard LaserJet printer. It's not cheap—\$3,500 list and \$2,600 discounted—but if you're serious about good looks, you need one. Most users buy these printers just to create sharp-looking correspondence and don't take advantage of the laser printer's ability to produce typeset quality work: product announcements, in-house company publications, and high-priced newsletters. (Ironically, my favorite newsletter

boasts of using the even-better and twice-as-costly Apple LaserWriter, and yet the finished result looks no better than if it had been typewritten. However, I think that this is a case of handing an electron microscope to a naked savage.) I recommend that if you are thinking of purchasing a laser printer and you're not equipped to drive it to the limit, save your money.

If you're thinking of buying an H-P LaserJet, you should be wary of aggressive salesmen who might tempt you to buy a bunch of font cartridges to go along with it. They cost \$330 a pop, so be prudent. Your best bet is to get started with just the F cartridge, called TMS Proportional-2, and then see what else you might need later on.

More on the LaserJet Front

Lately, a bunch of utility programs to augment the H-P LaserJet have been appearing on the market. Everything is fine when you're using a program, such as *Word*, that knows how to make the LaserJet jump through a hoop, but what about when you're dumping some data to the printer from a less-sophisticated program that doesn't know the difference? These laser utilities take care of this problem, letting you send set-up commands to the printer to select the best font, margins, and so forth, for what's at hand. It's a great idea. I've tried two of these programs, and they offer case-study examples of how small utility programs can be either well engineered or crude. The slicker—and cheaper—one is *SetHP* (\$54 from Orbit Enterprises of

YOU FORCED US TO MOVE!

...and We Love You
For It!

LOGICSOFT

Because of the tremendous response you've given to our **FREE OVERNIGHT DELIVERY** and **10 OFF** policies, our growth has been phenomenal! Even we did not project how rapidly we would expand. Quite honestly there were times when it seemed like the whole country was trying to place an order...at the same time!

We realize that some of you have had problems getting through (our phones simply could not handle the volume) and, yes, some have even gotten their shipments late (our shipping department has been on a 12 hour schedule)...to those of you, **WE APOLOGIZE** for the inconvenience and would like to say **THANK YOU** for your patience.

A one million dollar investment has allowed us to solve these problems...we've just moved into our new World Headquarters, beefed up our sales department, added a spanking new phone system and built a fully automated warehouse.

Oh, sorry, we almost forgot "Herold" (who's extremely fast, but very sensitive) our new 100 terminal computer system. He's designed to speed up order processing to get your shipments out the door...test. Sorry Herold.

INTERNATIONAL ORDERS

EUROPE

Announcing Logicsoft Europe!

Our European friends may now order directly through our Amsterdam Distribution Center, which carries the latest factory fresh versions of the most sought after IBM PC software and hardware. Now you can receive your order fast and still take advantage of the money-saving deals that only direct order can offer. Please call or telex to confirm pricing & policies. Telex: 10759 Logic NL.

Call 020-634884 or mail orders to:
LOGICSOFT EUROPE BV
PO 3450, 1008 AL
AMSTERDAM, HOLLAND

CANADA

For our Canadian customers we've installed a special local number, 416-283-2354. Now you can get the biggest savings in mail-order for the cost of a local call. Or, if you wish, Telex 296905 Soft UR.

FAR EAST AND AUSTRALIA

Call 516-249-6440 and ask for our International Department. They're experts on export and you get to take advantage of our great mail order prices. Telex 296905 Soft UR. Please call or telex to confirm pricing & policies.

WE WILL BEAT
ANY PRICE BY

\$10

See Our Card for Details

FREE

Overnight Delivery

See Our Card for Details

**EVERYTHING YOU ALWAYS
WANTED TO KNOW ABOUT
BEATING A PRICE BUT WERE
AFRAID TO ASK...**

**or How I Learned To Save Money
Without Really Trying.**

We know there are still a few of you who have shied away from ordering from us (you know who you are) perhaps thinking our \$10.00 off and FREE overnight policies were a "gimmick" or a "come-on" to pressure you into something.

We'd like to tell you how simple it really is. Just pick up the phone and dial 1-800-645-3491, then tell your sales agent you'd like to beat a price (don't be embarrassed; he's not), the name and date of the publication and who you want us to beat. No gimmick, no come-on, it's that easy.

CONFUSED OVER ACCOUNTING SYSTEMS?



**We don't blame you, that's
why we invite you to give us a call.**

We've evaluated over 50 of them and just because you can save a lot of money buying mail order shouldn't mean you have to sacrifice service...We want to take the time to assist you before you buy. We realize that an accounting system can add up to a sizeable investment and helping you end up with the right package for your money is what doing business is all about.

ACCOUNTING SYSTEMS

	Information Unlimited (US)	Open Systems	Great Plans	Peachtree Series 8	State of The Art	Realworld (MBSI)	BPI
Accounts Payable	*299	*409	*499	*369	*479	*575	*395
Accounts Receivable	*299	*409	*499	*369	*479	*575	*395
Fixed Assets	---	*409	---	*369	---	---	---
General Ledger	*299	*409	*499	*369	*479	*575	*395
Inventory	*299	*409	*499	*369	*479	*575	*395
Job Costing	---	*409	*499	*369	---	---	*539
Material Management	---	*409	---	---	---	---	---
Order Entry/Processing	*299	*409	---	*369	*479	*575	---
Payroll	*365	*409	*499	*369	*479	*575	*395
Report Writer	---	*409	---	---	---	---	---
Sales Invoicing	---	---	---	*369	*479	---	---
Purchase Order Entry	---	*409	---	---	---	---	---

TCS Client Ledger System

JUST A PARTIAL LISTING OF ACCOUNTING SYSTEMS - CALL TODAY!

CIRCLE 282 ON READER SERVICE CARD

LOGICSOFT®

THE LOGICAL CHOICE
A Member of the Logic Group



110 Bi-County Blvd., Farmingdale, N.Y. 11735
1-800-645-3491
In New York State...516-249-8440 • In Canada...416-283-2354
Customer Service 1-800-431-9037

See following pages for Software, Hardware, Special Order Dept., Programmers Dept., PC Jr. Corner and our Computer Forms Division.

TEAR AND COMPARE! TEAR AND COMPARE! TEAR AND COMPARE! TEAR AND COMPARE! TEAR AND COMPARE!

**LOGICSOFT INCREDIBLE
NEW SERVICE BREAKTHROUGH**

FREE OVERNIGHT DELIVERY!

On Orders Totalling
Over \$100, Shipped
UPS FREE N
Under \$100

VIA...



**PLUS...IF YOU CAN FIND A LOWER PRICE
We'll Beat \$10
It By....**

THAT'S RIGHT! OUR LOWEST PRICE GUARANTEE IS STILL EFFECTIVE!

Tell us the advertiser and price of any software or hardware item on these pages currently advertised in any popular computer publication and we'll beat that price by \$10. This offer does not apply to items under \$100 or where the price is not lower than Logicsoft's. NO DEALER'S PLEASE!

SOFTWARE for IBM PC

WORD PROCESSING	
Wordstar 2000	\$259
WORDSTAR 2000 PLUS	309
Wordstar Pro Pac	265
Wordstar Pro Plus	345
WORD PERFECT (New Release)	245
Microsoft Word	245
Spellbinder	Lowest Price
MULTIMATE	249
Volkswriter Deluxe	165
Peacertext 5000	199
Easywriter II/Speller/Master	195
Edix & Wordix	255
FINALWORD	225
Samna III	325
Xy Write II Plus	255
Think Tank	125
plc: write	95
Wordplus PC with Boss	359
DATA BASE MANAGEMENT	
KNOWLEDGEMAN	\$259
Cornerstone	Lowest Price
Trim IV	149
R-Base 4000	265
R-BASE 5000	399
DB Master	475
d Base II (New Release)	299
Condor III	349

DATA BASE MANAGEMENT (cont.)	
d BASE III	\$365
Cipper (d Base III Compiler)	399
Qata Base Manager II (alpha)	175
Infester plus	159
Friday	169
plc: file & plc: report	165
REVELATION	745
Powabase	255
Personal Pearl	229
Easyflier	235
Superfile	159
GURU	Lowest Price
INTEGRATED/SPREADSHEETS	
LOTUS 1-2-3 (white title last)	\$305
Enable	399
Smart Series	579
Ability	339
FRAMEWORK	355
Open Access	395
Electric Desk	229
SYMPHONY (Limited Quantity)	429
Supercalc 3	175
Multiplan	129
TK! Solver	279
plc: plan	95
FINANCIAL	
DOLLARS AND SENSE	\$115

FINANCIAL (cont.)	
Financier II	\$115
MANAGING YOUR MONEY	119
Home Accountant Plus	99
Professional Tax Planner	319
Fixed Asset System (BEST)	439
Market Manager Plus (Dow Jones)	179
Market Analyzer (Dow Jones)	269
GRAPHICS	
CHARTMASTER	\$275
Signmaster	195
GPS Graphics	269
plc: graph	95
GRAPHWRITER	319
Graphwriter Combo Pak	465
Microsoft Chart	175
ENERGRAPHICS	259
Energraphics with plotter option	325
PC Draw	295
Gem Draw (incl. Desk Top)	95
AUTOCAD	as low as 799
PROJECT SCHEDULERS	
MICROSOFT PROJECT	\$165
SuperProject (I/US)	245
HARVARD TOTAL PROJECT MGR.	285
Project Scheduler (Scitor)	195
Project Scheduler 5000 (Scitor)	295

SEE OTHER SIDE
FOR MORE SAVINGS!

SOFTWARE UTILITIES for IBM PC

WORD PROCESSING	
FANCY FONT	\$139
Wordplus (Oasis)	115
plc: proof	65
Punctuation & Style	99
Spellix	59
Wordperfect Sorter	75

DATA BASE	
Quickcode III	\$159
d Graph III	175
d Util III	85
k Graph	175
k Paint	85
k Text	109

DATA BASE (cont.)	
Clout 2	\$145
Extended Report Writer	119
Sideways	45
GENERAL	
PROKEY 4.0	\$89
Norton Utilities (New Release)	85
SIOKICK (unprotected)	65

GENERAL	
CROSSTALK XVI (New Release)	\$115
Smartcom II	109
Sideways	45
Copy II PC	35
DESK ORGANIZER	95
Spotlight	95

Prices & policies subject to change without notice

Immediate Replacement on any Defective Product

• NO SURCHARGE for VISA & MasterCard • No Sales Tax on Orders Outside N.Y. State • Purchase Orders
Accepted from Qualified Institutions • NO SURCHARGE! Please call for price verification. • Please add 5%
for handling and insurance (all orders add 1) • Payment: MasterCard, VISA, American Exp., C.D.S., Money Order or Check

National Sales
Hot Line

1-800-645-3491

Customer Service 1-800-431-9037

New York State...516-249-8440

Canada...416-263-2354

Domestic/International Telex...268905 Soft UR

LOGICSOFT

THE LOGICAL CHOICE

A Member of The Logic Group

110 Bi-County Blvd., Farmingdale, N.Y. 11735

WE WILL BEAT
ANY PRICE BY

\$10

See Other Side for Details

NEW! Expanded Special Order Dept.

We know there are many products that simply cannot be found through mail order. We've solved that problem...just ask for our **SPECIAL ORDER** department...We've got the suppliers...still at low mail order prices!

FREE

Overnight Delivery
See Other Side for Details

PC JUNIOR CORNER

SOFTWARE

Lotus 1-2-3 (what they best)	\$309
Wordstar	149
Electric Desk	189
HARDWARE	
Captain 128K (1 year)	339
PC Mouse (Mouse Systems)	129

HARDWARE (Cont.)

Keytronic 5151 Keyboard	\$179
Keytronic 5149 Num. Keypad	50
Jr. 128K Booster (Phoenix)	145
Quadram Expansion Chassis	519
Quadram Exp. Memory	235
Quadram Jr.	219

NEW PRODUCTS ADDED DAILY...CALL!

PROGRAMMERS DEPT.

Concurrent PC DOS (Windows)

Pascal MIT + (PC DOS)	\$89
PLI 1 - (DOS)	349
Display Manager (DR)	489
Access Manager (DR)	269
LATTICE C COMPILER	305
C-Food Smorgasbord	119

Pascal Compiler (MS)

C Compiler (MS)	\$245
MicroSoft Sort	159
Cobol Compiler (MS)	479
Business Basic (MS)	299
FORTHAN COMPILER (MS)	229
C86 C Compiler (Computer Innovations)	329

GENERAL HARDWARE

PRINTERS*

QIABLO	
36**	\$1229
D25**	619
630 API	1529
630 ECS**	1799
EPSON	
L01500	\$1199
Parallel Interface	79
JX-80	599
LX-80**	265
LX-80 Tractor/Feeder	30
RX-100	399
FX-80 Plus**	379
FX-185 (New)**	569
JUKI	
6100	\$439
6300	799
MARNESMANN TALLY	
Sprint 80	\$279
180	579
160	849
NEC	
2030**	\$719
2050**	695
3530	1329
3550	1395
8850**	1949
Pinwriter P2**	875
Pinwriter P3**	895
OKIDATA	
182P	\$239
84-18M	799
192-18M	409
193P	559
2410P	2295
QUME	
Sprint 11/40**	\$1299
Sprint 11/55**	1595
Sprint 11/90**	2199
SILVER REED	
400	\$279
500	349
550	449
770	795
TOSHIBA	
P351 Tractor	\$165
P351	1375
1340	779
CITIZEN	
MSP10	\$409

PRINTERS (cont d.)

MSP15	619
MSP20	579
MSP25	789

PRINTER/PLOTTERS*

HOUSTON INSTRUMENT	
PC Plotter	\$475

MONITORS*

AMDEK	
Color 300	\$255
Color 500	389
Color 600	479
Color 710	579
12" Green 300G	135
12" Amber 300A	145
12" Amber 310A	169
NEC	
J8 1201	\$159
J8 1205	149
JC 1215	239
JC 1216	399
PRINCETON GRAPHICS	
RGB HX 12	\$489
RGB SR 12	599
Scan Doubler Board (for SR 12)	185
Amber Max 12E	185
QUADRAM	
Quadchrome 12"	\$465
Quadchrome 17"	1595
Quadchrome II 14"	465
Amberchrome 12"	165
TAXAN	
1060	\$125
105A	135
121	149
122	149
210	259
420	409
440	699

MULTI-FUNCTION BOARDS

AST RESEARCH	
Six Pak Plus (84k)	\$259
Mega Plus II (84k)	275
Mega Pak (256k)	369
Advantage (128k)	429
W Plus II	135
ORCHHO	
Blossom (D-k)	\$235
QUADRAM	
Quadboard (84k)	\$245

MULTI-FUNCTION BOARDS (cont.)

STB	
Super Rio (84k)	\$329
Rio Plus II (84k)	259
Rio Grande	375
Chameleon	Lowest Price
TECMAR	
Captain (84k)	\$199
COMMUNICATIONS BOARDS	
AST	
AST-5251.11	\$699
AST-SNA	\$699
AST-8SC	699
AST-3780	749

GRAPHICS BOARDS

AST	
Monograph plus	\$425
Preview	279
EVEREX	
Graphics Edge	\$375
HERCULES	
Graphics Card	\$325
Color Card	169
MA SYSTEMS	
Peacock Color Board	\$245
PARADISE SYSTEMS	
Multi-Display Card	\$215
Modular Graphics Card	289
Options A & B	Lowest Price
QUADRAM	
Quadcolor I	\$195
Quadcolor II	465
SIGMA	
Color 400	\$549
STB	
Graphics Plus II	\$315
TECMAR	
Graphics Master	\$459
TSENG LABORATORIES	
Ultra Pak	\$845

MODEMS

HAYES	
Smartmodem 300	\$205
Smartmodem 1200	445
Smartmodem 1200S	385
Smartmodem 2400	719
NOVATION	
Access 1-2-3	\$475
Smart Cat Plus (Int.)	355
Professional 2400	635
PRENTICE	
Popcom X100	\$379

MODEMS (cont.)

Popcom C100	355
PROMETHEUS	
Pro-modem 1200	\$375
Pro-Modem 1200S	319
QUADRAM	
Asher	\$395
Quadmodem II	Lowest Price
RACAL VADC	
Maxwell 1200 PC	\$395
Maxwell 1200 V	439
2400 PC	635
VEN-TEL	
PC Modem Hall Card	\$379
PC Modem 1200	399
1200 Plus	399

BACK-UP DEVICES

ALLOY	
PC Quick Tape (80Mb)	\$1719
SYSEN	
Image (10Mb)	\$835

MOUSE INPUT DEVICES

MOUSE SYSTEMS	
PC Mouse w/paintbrush	\$139
MICROSOFT	
Microsoft Mouse (Serial)	\$149
Microsoft Mouse (Bus)	139

SURGE PROTECTORS

KENSINGTON MICROWARE	
Master Piece	\$115
CURTIS	
Diamond	\$39
Emerald	49
Sapphire	59
Ruby	69

KEYBOARDS

KEYTRONIC	
5150	\$159
5151 (Deluxe)	179
5152B	645

MEMORY CHIPS

64k (200ns)	\$35
256K (150ns)	69

DISKETTES

LOGICTRAK 5 1/4"-100% GUARANTEED	
Durable disks, double density, 10 per box	
20 + boxes	per disk \$2.35
10-19 boxes	per disk \$2.50
2-9 boxes	per disk \$2.99
1 box	per disk \$3.99

*Due to weight restrictions, Printers and Monitors are shipped UPS...FREE

**Parallel interface req...Ask sales agent

*Due to weight restrictions, Printers and Monitors are shipped UPS...FREE! **Parallel interface req...Ask sales agent

• NO SUBCARRIER FOR VISA or MasterCard • No Sales Tax on Orders Outside N.Y. State • Purchase Orders
• Minimum Order \$50.00 • Payment: MasterCard, VISA, American Exp., C.D., Money Order or Check
• Handling and Insurance (Int'l orders only) • Payment: MasterCard, VISA, American Exp., C.D., Money Order or Check

National Sales
Hot Line

1-800-645-3491

Customer Service 1-800-431-9037

New York State 516-249-8440

Canada 416-283-2354

Domestic/International Telex 286905 Soft UR

LOGICSOFT

THE LOGICAL CHOICE
A Member of The Logic Group

110 Bi-County Blvd., Farmingdale, N.Y. 11735

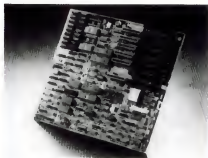
TEAR AND COMPARE!

TEAR AND COMPARE!

TEAR AND COMPARE!

TEAR AND COMPARE!

NO WHERE BUT HERE!



- PC & AT MOTHER BOARDS
- 8 MHz PC SYSTEM
- COMPLETE FAMILY OF PC ENHANCEMENT CARDS
- KEYBOARDS AND MORE...

Distributor or OEM Inquiry Welcome.



Multitech
Committed to Excellence, Quality & Service

For your nearest Distributor: CALL TOLL FREE (800) 898-1848
in California, CALL (408) 773-8400

1008 STEWART DRIVE SUNNYVALE, CA., 94088
CIRCLE 167 ON READER SERVICE CARD

DISK MECHANIC

The ULTIMATE Backup, Analyze & Repair Utility
The Disk Toolkit NO IBM PC Should be Without
Protects Your Software Investment

BACKUP TOOLS:

- Can Backup Most Every Diskette
- SUCCEEDS where others fail!
- Works Manually or Automatically
- Create "Protected" Diskettes
- Many Additional Analysis Tools

SECTOR TOOLS:

- Examine/Print Sector Data
- Modify (ZAP) Sector Data
- Compare, Copy & Zero Sectors
- Search Sectors For Data

FILE TOOLS:

- Show Disk & File Allocation
- Display & Alter File Data
- Repair Damaged Data
- Recover Erased Files
- Alter "Hidden" Status
- Search Files For Data

HACKER TOOLS:

- Modify Floppy Disk Controller Parameters
- Supports All FDC R/W Commands

DISK MECHANIC works with all standard IBM PC disk formats including "protected" diskettes with mixed track and sector sizes, blank and high track formatting, CRC errors, and single or double sided drives. DISK MECHANIC requires an IBM PC with 128K of memory or COMPAQ with 128K of memory, DOS 1.10, and 2 floppy disk drives. DISK MECHANIC includes a detailed 48 page instruction manual. To Order DISK MECHANIC send check or money order for \$70 plus \$3 for shipping (Mass. res. add sales tax.) to: MLI MICROSYSTEMS, Box 825, Framingham, Mass. 01701 or Call (617) 826-3055 for Mastercard or VISA orders. Dealer/Distributor inquiries welcome. ©1983 MLI MICROSYSTEMS.

MLI MICROSYSTEMS

CIRCLE 349 ON READER SERVICE CARD



Contemporary ComputerWear

DUST COVERS
FOR
THE IBM PC



Attire your IBM PC in Style!

ComputerWear—Beige, 100% cotton canvas covers with grey trim and embroidered emblem. Order Now! Satisfaction guaranteed. Custom logo in quantity.

- ☐ Yes, protect my PC in style! Send me:
- ___ Keyboard \$18
 - ___ Monitor \$18
 - ___ Drive \$18
 - ___ 1 pc Mon/Drive \$36
 - ___ Printer (Epson MX/FX-80) \$18
 - ___ Okidata 82, 92)

- ___ Printer (Epson FX-100, \$20
- ___ NEC P3, Okidata 83, 93)
- ___ Printer (NEC 3850) \$20

☐ Visa ☐ MC ☐ Check
Add \$2.00 Shipping. Total:
(California residents add tax)

Print Name _____

Address _____

City/State _____ Zip _____

Credit Card # _____ Exp. _____

Contemporary ComputerWear

1320-36th Ave. / San Francisco, CA 94122 / (415) 759-1466

IBM is a registered trademark of IBM Corp. Dealer inquiries invited. PC-AT covers available.

CIRCLE 121 ON READER SERVICE CARD

Glen Ellyn, Inc.) It has just enough razz-matazz to please you without overdoing it in an annoying way. The clumsy and obnoxious turkey is *JetSet* (\$80 from Datamate). Its one saving grace is that it

comes with a text-formatting program, which you need if you don't have a real word processing program. But if you don't have a word processor, what are you doing with a \$3,500 printer?

A Rival Publication

A few issues ago, I mentioned *Software Digest* in passing, and now I'd like to elaborate on this pricey (\$185) review publication, which covers one type of program, such as spreadsheets or word processors, each month. I think a great deal of *Software Digest* (even though it didn't review my programs in the issue devoted to miscellaneous utility programs). For those who aren't familiar with it, *Software Digest* resembles the beloved *Consumer Reports*.

Both magazines attempt to offer fair, unbiased, and even scientific evaluations of products. They also have a few strong similarities that you may find as distasteful as I do. For one thing, I occasionally doubt their judgment about what are important categories to review. For example, *Software Digest* devoted half an issue to time management programs. In addition both publications' criteria for evaluating products occasionally seem questionable. I sometimes believe *Consumer Reports* has some axes to grind, but I haven't found *Software Digest* to be that bad yet.

Fair Evaluation

Whether you agree with it or not, *Software Digest* offers you a basis of comparison: it gives you another opinion to measure your own against and a fair evaluation when you just don't know what's what. Its ratings for integrated packages are right on target in my opinion—it rates *Framework* and *Symphony* 1st and 4th, respectively—but I didn't agree with its word processor reviews. It rates the simple-to-learn but unversatile *PFS:WRITE* number 1 and *Microsoft Word* 12th.

The beauty of *Software Digest* is that it thoroughly describes its criteria and gives separate evaluations in such categories as ease of learning, ease of use, error handling, performance, and versatility, in addition to its overall evaluation. And all of this is just in the summary. In the detailed notes, it shows it all. In other words, you can see that *PFS:WRITE* is easy to use but lacks versatility or that *Framework* recalculates only slightly faster than you could using your fingers and toes.

In addition to your subscription to *PC*

Your hard disk has a serious problem that's ready to explode.



When you first started using a hard disk system, you thought its enormous storage capacity solved all your problems. Little did you suspect that you were gaining a new problem that's getting out of control: Disk organization.

Now that your hard disk can literally hold thousands of files, how are you going to easily find the one file you want, whose name you may have forgotten? Sort the files in some kind of logical order? Rename them or move them around?

Don't look to PC-DOS for help. In fact, you may have found it so difficult to manipulate your files with PC-DOS, you don't bother to remove the redundant or unnecessary ones. You just keep adding files to your disk and pray that it doesn't reach critical mass.

Well, help is at hand — with *KEEPTACK*, quite simply the best software system for disk organization and maintenance you can buy.

KEEPTACK's screen display lets you see your entire disk's contents at a glance. Its friendly "browse-and-mark" system lets you view, move, copy, remove, and rename files or directories without key-boarding confusing PC-DOS commands.



You can sort five ways, including alphabetically. Its search function is so fast, it can locate the file you want in less than two seconds! Even if you don't remember the file's exact name, *KEEPTACK* will find it! Full on-screen help is always a keystroke away. And all this is just a small sample of how *KEEPTACK* can solve your PC problems.

KEEPTACK even comes with a book that clearly explains the "why's and how's" of disk management. It alone is worth the price of the entire package.

And what is the price? Just \$79!

KEEPTACK is not copy-protected.

VISA and MC card holders can order by calling (415) 322-6161. To order by mail, send your check for \$84 (\$5 for S&H) to: THE FINOT GROUP, 2390 El Camino Real, Suite 3, Palo Alto, CA 94306. California residents, add applicable sales tax.

For more information, contact us today.

Requirements: IBM® PC XT, AT, or COMPAQ® and other true compatibles with 1024K under PC-DOS 2.0 or higher. With 30MB or 40MB hard disk, you need 256K.



IBM and COMPAQ are registered trademarks of International Business Machines Corp. and COMPAQ Computer Corp. respectively.



Magazine, I'd highly recommend that you subscribe to *Software Digest* if you need serious and methodical software reviews. The regular periodicals, including *PC Magazine*, are great for breadth—hardware and software, new stuff, and odd stuff—and depth, too (for example, *PC Magazine's* legendary Project: Database, Volume 3 Number 11).

Digest on a Disk

Another *Software Digest* bonus, which may not apply to the ordinary user but can be extremely important to large organizations that need to do a heavy-duty evaluation of programs in the major categories, is that you can buy the magazine's product ratings on a live disk. The idea is very simple, but profoundly useful. The *Digest's* research has dug up lots and lots of totally objective facts: what features are present, what the data capacities are, how long recalculations take, and so forth. And then, for its evaluations, it adds up the facts using a formula that includes subjective judgments of what matters and the relative weighting of different factors.

What's special about the disk version of *Software Digest*, of course, is that it allows you to include our own criteria for what matters and what's irrelevant and for how much weight you should give to different factors. As a result, you can do your own "what if" juggling of the evaluation criteria, very much the same way you do it with financial plans on a spreadsheet.

If you have to produce a serious evaluation of databases, spreadsheets, or word processors for your organization, this live disk is a great idea, whether you want to do it for real or just want some very convincing-looking pseudo-scientific methods to persuade your boss that you did a good job of picking the right stuff.

Finally, I want to pass on a sophisticated trick that you can use with the disk version of *Software Digest* or in any other subjective evaluation. Most people make the mistake of assigning some arbitrary middle weight to the factors of unknown importance, figuring that unknowns should be treated as neutrals, neither important nor unimportant. In-

stead, you should do several "what if" calculations, treating each of the unknowns, in turn, as highly important. More often than not, a contradictory variety of different candidates will appear

at the top of your "what if" evaluations, but one candidate may emerge as consistently good, just below the top ratings. This slick trick separates the real winners from a crowd of show-offs. ■

DO YOU FEEL ALL ALONE
OUT THERE WHEN IT'S TIME
TO RUN DOS ON YOUR PC?



**STARBRIDGE™
DOS**

A Menu Interface Program Introducing
One-Key Access to DOS Commands
DOS Expertise No Longer Needed.

SYSTEM FEATURES

- * Selection of "plain English" commands with one key-stroke
- * Access to on-line help prompts and graphics at any time
- * Single keystroke logging of multiple files for copy in one operation
- * Access to a complete on-line DOS reference guide with easy-to-follow examples
- * Custom Menu building for your application programs
- * A communications program is included for access to the Starbridge Electronic support HOTLINE.
- * Automatic display of PC "vital signs"
Current disk drive at any time
Disk space available status
Low disk space warning message
RAM memory on-board and available at any time
System date and time

RUNS ON THE FOLLOWING PC's:

IBM — PC, XT, PCjr
AT&T Portable PC or PC AT
AT&T 6300 PC
COMPAQ or any true IBM compatible
PC — DOS 2.0, 2.10 or 3.0

We suggest your PC have a minimum of 128KB
Our program requires 64KB

Dealer Order Hotline: call for sales kit
(800) 874-0861 (outside Calif.)
(800) 228-3499 (Calif. only)

Rush order call (213) 277-3183	
\$49.95/Copy Plus \$2.50 Shipping	
Enter total = _____	
California residents add 6% tax = _____	
TOTAL = _____	
<input type="checkbox"/> Check	<input type="checkbox"/> VISA <input type="checkbox"/> MasterCard Card number _____
Name on card _____	Expiration date _____
Ship to _____	
Address _____	
City _____	State _____ Zip _____
Signature _____	Print name _____

**STARBRIDGE TECHNOLOGIES
CORP.**
1925 Century Park East
Los Angeles, Calif. 90067

YOUR STROKE OF GENIUS

Let our On-Line Reference series increase your productivity...
Just a keystroke away!



OLE™, our new On-Line Encyclopedia series for IBM PC's and compatibles is organized by subjects and alphabetically by keywords... for quick specific reference or indepth study. OLE uses pictures, animation, text, and understandable annotations to help you get up to speed quickly on any covered topic.

OLE is just a keystroke away because it sits co-resident in memory allowing you to access one or more of our encyclopedia series.

OLEs will increase your computer proficiency and enhance your productivity. Using OLE will be a stroke of genius on your part!

The first six volumes currently available are:

OLE DOS Makes all the complex DOS commands easy to understand and implement. Suggested retail price, only **\$69.95**.

OLE UNIX A clear, concise and unambiguous introduction to the UNIX multi-user operating system. Suggested retail price, only **\$69.95**.

OLE Data Communications Clarifies complex concepts with more than 75 key terms presented. Suggested retail price, only **\$69.95**.

OLE BASIC An excellent guide for learning to program using BASIC. Quick on-line reference of key terms. Suggested retail price, only **\$69.95**.

OLE Computer Literacy Vols. 1 & 2 Volume 1 is a keyword based tutorial of fundamental terms. Volume 2 provides an easy intro to databases, spreadsheets, word processors, accounting and graphics. Suggested retail price, each volume, only **\$39.95**.

Requirements: IBM Color Graphics Adapter Card required. 256K RAM.

To order call toll free
1-800-GET-OLÉS

CIRCLE 158 ON READER SERVICE CARD

HYPERGRAPHICS
CORPORATION

308 N. Carroll Blvd.
Denton, TX 76201





REESTABLISHES THE COST TO PERFORMANCE BASELINE.

Allen-Harris Industries, Inc. brings you the price and performance that you demand from today's technology. With a unique data repository concept, GP-Tools breaks through the boredom of data base management with GP-File, GP-Print and GP-Utility.

GP-FILE

- Data file attributes and screen display formats generated in one step.
- Instantaneous screen displays.
- Data retrieval in a fraction of the time found in other systems... regardless of primary or secondary key assignment.
- Security with encrypted password protection for your data.
- Up to 99 sub-views of your master data file display (each with a password option).

GP-PRINT

- Design your reports on the screen... graphically!
- Produce an unlimited number of sophisticated reports for each data file.
- Wide variety of printers supported...plus, custom printer option!
- Send reports to screen, printer or disc.
- Modify report formats easily.

GP-UTILITY

- Modify data file attributes or screen display formats.
- Sort files with parameters to enhance reports.
- Obtain data file structure information.
- Change password for maximum protection.
- File management.

ALLEN-HARRIS INDUSTRIES, INC.
130 UNIVERSITY PARK DRIVE - SUITE 105
WINTER PARK, FLORIDA 32792
TELEPHONE 305/657-1144



CIRCLE 234 ON READER SERVICE CARD

GP-TOOLS is a division of Allen-Harris Industries, Inc.
GP-TOOLS includes GP-File, GP-Print and GP-Utility

AVAILABLE SEPTEMBER 17.

The More Perfect PC

In this first of a two-part series, we look at what the next generation of PCs will bring: By 1988, the standard PC may have EGA color graphics, a 10-MHz clock, and 10 megabytes of RAM.

Accustomed—and addicted—to the rapid-fire increases in personal computer speed and power appearing on the market, PC users are beginning to ask, "How close is another really big jump in memory and speed? And when will the new machines be available?" By looking at the best of today's hardware and software, you can make intelligent guesses about microcomputers 2 to 5 years in the future.

It is reasonable to conjecture that the replacement for the current PC and AT will cost about \$3,000. But toward 1988, the system would look something like this: a 10 MHz Intel 80286 (286) microprocessor, a bit-mapped display such as the IBM Enhanced Graphics Adapter that has 640- by 350-pixel resolution and can use 16 or more colors out of a very large palette, 4 megabytes of truly usable RAM, a fast 40-megabyte Winchester disk, a 550-megabyte CD-ROM optical disk, a 2 megabyte 3.5-inch floppy, and a mouse. In 5 years, you can look forward to a much more powerful processor, such as the Intel 80386 32-bit chip. The other big change will be still more RAM: perhaps 20 to 30 megabytes of RAM in a PC.

The IBM AT already augurs good things to come. Its 6-MHz Intel 80286 microprocessor gives it about two or three times the processing speed of the original 8088-based PC. Even more important is the AT's large RAM capacity. Unlike the 8088, which can directly address only 1 megabyte, the 80286 can handle 16. Although IBM officially sanctions "only" 3 megabytes of RAM

in the AT, you can stuff in several extra megabytes by using third-party memory boards. The AT's 20-megabyte hard disk has twice the capacity of an XT drive and is more than three times as fast. It also uses 1.2-megabyte floppy disks that hold



Ron Jeffries

more than three times as much as the 360K-byte PC floppy disks.

The Apple Macintosh is another bellwether of the next generation of PCs. The Mac uses the Motorola 68000 microprocessor, which is arguably superior to the AT's 80286. A big advantage of the 68000 is its linear, or "flat," address space, which is easier for programmers to use than the clumsy 64K-byte memory segments of the 80286. The most important feature of the Mac is its consistent, visually oriented user interface. The Mac's high-resolution, bit-mapped monochrome display offers good graphics and supports a rich variety

of typefaces. Since a mouse comes with every Mac, all application software can assume a mouse is available—a sharp contrast to the IBM PC.

The Commodore Amiga and the Atari ST could also point the way toward the PC of the future. Like the Mac, the Amiga and ST both use the Motorola 68000, bit-mapped displays, a visual user interface, and a mouse. Also, the Amiga uses custom VLSI graphics chips for dazzling color graphics.

An important feature common to the Mac, Amiga, and ST is a high-resolution bit-mapped display. Although the screen of today's Mac is still black and white, Apple is currently beta testing a color version. The Amiga and the ST already support color. A standard, high-resolution bit-mapped color display is unquestionably required for future PCs. This isn't a tough requirement, since the IBM Enhanced Graphics Adapter (EGA) offers the needed resolution, unlike the original medium-resolution graphics adapter. (Incidentally, IBM is expected to release a much faster, and perhaps more powerful, version of the EGA soon.)

Software developers need to be able to rely on EGA graphics and a mouse as a minimum standard available on every machine. Since the graphics adapter was an option on the original PC, a given PC might have any of several displays. Most have the IBM monochrome display adapter, which doesn't support bit-mapped graphics. It's time the PC adopted a minimum standard for the display and the EGA is the best possibility.

Another vitally important hardware



IBM PC
256K, two disk drives,
360K each, drive
controller and
keyboard. Call for
prices on other
configurations.....CALL

IBM DISKETTES, DSD, 10 pack ...\$29.95

**EXPANDED QUADBOARD
BY QUADRAM\$179**

One parallel port, one
serial port, clock/calender,
OK, memory ex-
pansion to 384K,
game port, I/O bracket and
Quadmaster
software.



64K\$190

AST SIXPACK PLUS, 64K\$225

TANDON TM 100-2\$95

5 1/4" full height drive, DS
DD. Specialty drive A or B.
Comes with step-by-step
installation instructions.



TANDON TM 65-2L\$105

Same as TM 100-2 but half height.

**OKIDATA ML192/P/PRINTER WITH PLUG
AND PLAY INSTALLED\$349**

160 CPS, 80 columns, all points
addressable graphics,
correspondence
quality printing
capability. Full IBM
PC compatibility.



OKIDATA ML193/P/PRINTER\$499

Same as ML192/P but with wide carriage
and tractor.

EPSON FX 80/FX 100+CALL

TURBO 10 HARD DISK\$570

10MB internal hard disk, three times faster
than XT, 13 months warranty. Controller
and cable included.

CALL

203-888-1867

**GEM
ELECTRONICS, INC.**

HOURS:

Mon.-Fri. 9 AM to 6 PM

24 Carriage Drive, Oxford, CT 06483

PRINTERS

Citizen 1020
Epson/FX80/FX100+
H P Laser Jet
NEC 2050/3350
Okidata ML192/193
Ritenour Blue Plus

\$309-439

CALL

\$679-1069

\$349-499

\$349

BOARDS & ACCESSORIES

AST SixPackPlus, 64K
Kamerling Labs PC Supercharger
Kensington Masterpiece
Quadboard Turbo 186
PC Jr. impulse, p. port, clock, OK
Perry's Time Spectrum, 64K
Quadboard, expanded, OK, 64K
STB RIO Plus II, 64K
Tecmar Captain, OK
Titan Accelerator for XT
Titan Cygnus, game port, p. port, clock

\$225

\$825

\$99

\$579

\$189

\$195

\$179-190

\$185

\$179

\$145



COD No Surcharge, VISA & MC Add 3%

QUANTUM LEAP

development in the next few years will be the tremendous increase in RAM. The transition from 64-kilobit to 256-kilobit RAM chips is proceeding so rapidly that 1-megabit chips shouldn't be far behind. It looks as though you'll see at least one—and probably two—more generations of memory by 1990.

Before I continue, I'd like to put in a word about units. The capacity of RAM chips is given in *kilobits*, while the memory capacity of a computer system is measured in *kilobytes*. A byte (which holds one character, such as the letter *a*) requires 8 bits. IBM also uses a ninth parity bit for each byte, which allows the system to detect most memory problems. For a given generation of memory chips, 9 chips (8 plus the one for parity) are needed to provide as many bytes of storage as a given chip holds bits. For example, with 64-kilobit chips, 9 chips are needed for about 64 kilobytes. A PC with 640 kilobytes has ten banks of RAM chips with 9 chips in each bank, for a total of 90 chips.

One simple way to estimate the memory capacity of the future PC is to take the same number of chips used with the current memory generation, then calculate the increased capacity the higher-density chips offer. The justification for this approach is that historically the cost per memory chip is about the same (or lower) across memory generations.

For about the same price, each new generation of chips has provided about four times the memory of the previous one. Using the same number of chips as today's 640K-byte PC, but switching to the new 256K-bit chips, increases memory capacity to 2.5 megabytes.

That's not all. Since the price of 256K-bit chips has fallen so fast, most experts feel that the 1-megabit chip will be here much sooner than expected. Using 1-megabit chips, the standard PC with ten banks of memory chips (nine chips per bank) will have 10 megabytes of RAM. Current projections indicate that 1-megabit chips will appear in mid-1986.

By 1990 memory chips could each hold 4-megabits. Since a bank of nine memory chips will then store 4 megabytes, the standard PC with ten banks of memory will hold 40-megabytes. But

that figure is rather exaggerated. With such large amounts of memory, more-sophisticated methods of detecting and correcting memory errors become necessary. Error detection and correction require a large amount of redundant memory, instead of the single parity bit used in today's PC. But even if you make the assumption that as much as 30 percent of memory is used for error correction, you will still get 28 megabytes of useable RAM.

But the 80286 chip can directly address only 16 megabytes. No problem: Intel is already hard at work on a true 32-bit processor called the 80386 that can address 4 gigabytes; Motorola, National Semiconductor, and several others are producing true 32-bit processors.

What can you do with all that memory? Old hands in the computer industry have an almost instinctive answer: you'll waste most of it! But don't think you'll be using today's relatively skinny PC-DOS. Microsoft and IBM are working on new operating systems to handle more RAM and add functions to DOS.

Besides the voracious, but dandy, new operating system, there are plenty of uses for extra memory. Large integrated packages are straining within the memory limits of today's 640K-byte PC. These programs will probably quickly expand to fill the projected 2.5 megabytes that will soon be available. A new generation of software is already under development that uses memory-hungry artificial intelligence techniques. The 10 megabytes of RAM that the 1 megabit chips will allow will arrive just in time for these new monster software systems.

Resident software such as keyboard enhancers and other "desk tools" already use a significant amount of memory (60K bytes isn't unusual). Although 60K-byte chunks start to add up on a 640K-byte system, the multimegabyte RAM in the future PC may make it reasonable to handle multitasking by having all the programs stay resident, and flipping instantly from one to another—like IBM's much-maligned *TopView*.

In the next issue, I'll look at the ways that cheap RAM may influence the design of mass storage to make possible the "more perfect PC."



IF YOU'RE TIRED OF PAYING OUTRAGEOUS LONG DISTANCE CHARGES EVERY TIME YOUR COMPUTER TALKS ON THE PHONE, GTE Telenet OFFERS AN ALTERNATIVE. IT'S CALLED PC PURSUIT.SM

NOW FOR ONLY \$25 A MONTH (PLUS A ONE-TIME INSTALLATION FEE OF \$25) YOU'LL BE ABLE TO REACH OTHER PC SUBSCRIBERS. FREE LOCAL DATA BASES AND BULLETIN BOARDS IN ATLANTA, BOSTON, CHICAGO, DALLAS, DENVER, DETROIT, HOUSTON, LOS ANGELES, NEW YORK (AREA CODE 212), PHILADELPHIA, SAN FRANCISCO AND WASHINGTON D.C. AND TAKE ADVANTAGE OF LOCAL SOFTWARE DOWNLOADING CAPABILITIES, AS WELL.

YOU CAN USE THE PC PURSUIT SERVICE BETWEEN 6PM AND 7AM WEEKDAYS, AND ALL DAY ON WEEKENDS. ALL YOU NEED IS AN AUTO-ANSWER MODEM AND COMMUNICATIONS SOFTWARE.

AS PART OF GTE Telenet'S DATA NETWORK, THE PC PURSUIT SERVICE OFFERS THE QUALITY, RELIABILITY AND ACCURACY NEEDED IN THE PURSUIT OF INFORMATION.

FOR MORE INFORMATION CALL 800-346-4215 BETWEEN 9AM AND 5PM. AFTER HOURS CALL 800-835-3001 ON YOUR TERMINAL TO SIGN UP AND START USING THE SERVICE. OR USE THIS SECOND NUMBER TO GET OUR ON-LINE USERS GUIDE.

WITH PC PURSUIT, YOU CAN FINALLY GET YOUR HANDS ON THE INFORMATION YOU NEED, WITHOUT PAYING AN ARM AND A LEG.

GTE Telenet

CIRCLE 229 ON READER SERVICE CARD

NOW YOU DON'T HAVE TO PAY THIS MUCH
TO ACCESS INFORMATION WITH YOUR HOME COMPUTER.

YOU get ABSOLUTELY the BEST SUPPORT and SERVICE. Call us and See!



PC PROGRAMMERS CORNER

Borland	
Turbo Pascal (v.3.0)	\$ 45
CompuView	
Vedit	\$130
Vedit+	170
Digital Research	
Specials	
Concurrent CPM	
Windows	\$115
DR Assembler & Tools	86 125
Fortran 77 Dos	295
C Basic Comp. 86	355
Concurrent PC Dos (v.4.1)	230
New Products	
Gem Draw	\$105
Gem Desktop	39
Emerging Technology	
Edix (editor)	\$139
Heritage	
Smartkey II	\$ 75
Microsoft	
Basic Comp	240
Morgan Computing	
Prof Basic	\$ 70
Trace 86	99
Peter Norton	
Norton Util (v.3.0)	\$ 59
Supersoft	
Fortran	\$209

SOFTWARE

SPECIALS

Decision Resources	
Chart-Master	\$215
Sign-Master	159
MDBS, Inc.	
Knowledge Man	\$ 258
Microim	
R:Base 5000	\$389

Alpha Software	
ESP	\$529
Electric Desk (PC)	209
Electric Desk (Jr.)	199

Ashton-Tate

d-Base II	Call
d-Base III (v.1.1)	Call
Framework	Call

BPI

Personal Acct'g	\$ 69
-----------------	-------

Borland

Side Kick	\$ 37
Turbo Pascal (v.3.0)	45
w/8087	75
Superkey	55

Cdex

All Training

Prog's	\$6 49
--------	--------

Copy Point

Copy II PC	\$ 34
------------	-------

CompuView

V-Print	\$ 99
V-Spell	99

Connecticut Software

Printer Boss w/Letter Boss and Sideline	
---	--

NEW (v.5) \$ 99

Consumer Software, Inc.

Spread Sheet Auditor (v.2.0)	\$109
------------------------------	-------

Data Transforms

Fontrix	\$ 95
---------	-------

Digital Marketing

Grammatik	\$ 80
Proofreader	42

Dow Jones

Market Analyzer	\$229
-----------------	-------

Emerging Technology

Wordix (formatter)	\$139
Prof Writers' Pkg.	319

Enertronics

Energraphics	\$209
w/Plotter Option	269

Fox & Geller

Quick Report	\$159
dUtil II or III	58
Quickcode II or III	150

Funk Software

Sideways	\$ 40
----------	-------

FYI

FYI 3000	\$259
----------	-------

Harvard Associates

PC Logo	\$ 99
---------	-------

Harvard Software

Project Manager	\$249
Total Project Mgr.	279

Hayes

Smartcom II	\$ 95
-------------	-------

Infocom

All Zorks	\$ 32
-----------	-------

This is only a sample of the nearly 10,000 products we carry. If you're interested in something that is not listed, PLEASE CALL!

1 800 826-1589

WITHIN WISCONSIN **1 800 472-3535**

INT'L TELEX: 260181 ORYX SYS WAU

Technical Support/Order Status/Customer Service:
Call (715) 848-1374.

Innovative Software

Smart System	\$599
TIM IV	269

Other Products...Call

Lifetree Software

Volkswriter Deluxe	\$155
Volkswriter Scientific	299

Living Videotaxi

Think Tank (258K)	\$110
-------------------	-------

MDBS, Inc.

K Graph	\$139
K Text	109
K Paint	85
K Report	139

Menio Corp.

In-Search	\$319
-----------	-------

MicroPro

WS ProPak (WS, CS, MM, S)	\$255
Wordstar	175
Wordstar 2000	255
Wordstar 2000+	295

Microrim

R:Base 4000	\$285
R:Base Clout (v.2.0)	159
Report Writer	95

Microsoft

Macro Assembler	\$109
Flight Simulator	39
Chart	159
MuMath/MuSimp (DOS)	179
Project	169
Multiphan (MS/DOS) (v.1.20)	129
Word (v.2.0) (DOS)	229
Others	Call

Microstuf

Crostalk (DOS)	\$ 99
Crostalk (CPM)	109
Remote	119

Morgan Computing

Professional Basic	\$ 79
--------------------	-------

Multimate Systems Inc.

Multimate (v.3.3)	\$265
-------------------	-------

Oasis

Word Plus	\$110
Punctuation & Style	99

Office Solutions

Office Writer	Call
---------------	------

Open Systems

Acct'g Prog	\$6 370
-------------	---------

Paladin

Flashcalc	Call
-----------	------

Peashtree Software

Back to Basics	
Acct'g System	\$219

PeachPak 4

(GL, AP, AR)	229
Acct'g Modules	359

Prentice Hall

VCN Execuision	\$259
----------------	-------

Quadrem-Quadsoft

Tax Strategist	\$209
Investment Strategist	209
4-1-1 Retrieval Syst.	99
Deadline Mgr.	99
Data Base Mgr.	139
Select Write:	
Wd Proc 101	69
Freestyle	199
Key II	199
Starmer	199
Kil/Symphony	89
Guide to Writing Business Plan	39

Rossoft

Prokey (v.4.0)	\$ 80
----------------	-------

Sanna Corp.

Word III	\$329
Sanna+	449

SPI Open Access

Satellite Software	\$319
--------------------	-------

Word Perfect w/Sp.

Word Perfect Jr.	\$229
Word Perfect Jr.	48
Others	Call

Sensible Designs

d Programmer	\$199
--------------	-------

Softcorp, Inc.

PRO-JECT 6	Call
------------	------

Softcraft

Fancy Font (v.2.0)	\$135
--------------------	-------

Softstyle

Printworks	\$ 49
------------	-------

Software Arts

TK Solver	\$285
Spotlight	109

Software Publishing

(Jr. Compatible)	
PFS: File, Graph, Plan, Write, Accase	\$6 80
PFS: Report	\$6 79

Sorcim/U.S.

Acctg. Mod.	\$399
Supercalc III	250

Star Software

Accounting Partner	\$210
Acctg. Partner II	599

Supersoft

Disk Doctor 86	\$ 69
Fortran	309
Other Products	Call

Thoughtware

Trigger	\$329
---------	-------

Warner Software

(Jr. Compatible)	
Desk Organizer	\$120

BOARDS

SPECIALS

Quadram
Quadboard 64K (CIC/
Cal. S & P) \$199
w/ 384K 244
(regularly \$289 w/
384K)

AST Research

Six Pak Plus 84K
(S & P, CINCAL, exp.
to 384K) \$229
MegaPlus 64K/CINCAL
(S Port) 269
512K cap w/MegaPlus
MegaPlus 128K 245
MegaPlus 256K exp. Call
Monograph Plus Call
CC-232 289
Preview Bd. 267
Advantage (AT) 449
DCA
Irma Board Call
Hercules
Color Card \$195
Koale
Touch Tablet \$ 99
Maynard Electronics
Floppy Drive Cntrlr. \$118
w/Par Port 169
w/Ser Port 179
Sandstar Call
Microlog
Baby Blue CPU + \$325
Baby Blue II 525
Quadram
MicroLaser Stack Printer
P/P BK 139
S/P BK
(exp 64K only) 149
S/S BK
(exp 64K only) 149
Quadlink 64K Mem. 385
Quadboard Silver Call
Quadboard Gold Call
Quadport AT Call
Liberty Call
Palette Master
(256 colors) 499
Quadgraph
(monographs) 379
Quadview (P/S CINCAL)
Soft Font w/Std S/W 269
Quadprint (doubles
proc speed
PC or XT) 489
All Other Products Call
Tecmar
1st Mate \$259
2nd Mate 250
3rd Mate 379
Captain 199

DISPLAY CARDS

Hercules
Graphics Board \$329
Peradise
Modular Display
Card \$285
Quadram
Quadcolor I \$199
Quadcolor II 389
Tecmar
Graphics Master \$479

PC

NETWORKING
(Please call our
Technical Department
for specific
configurations.)

AST

PC NET I - Coaxial
Configuration w/
Starter Kit
PC NET II - Twisted
Pair Configuration
w/Starter Kit

3Com

Etherseries -
Ethernet Technology -
Versatile PC Network

Quadram

Quadnet Series -
Quadnet II, VI, IX
Various networks for
varied applications

Corvus

OmniNet - Features
Corvus OmniDrive
available in 5.5
Meg to 128 Meg

PRINTERS

SPECIALS

Quadram
Quadjet \$395

Epson Call
Jannean Tally Call
NEC 3550 Call
OkiData 82-03 Call
Quadram
Quad Laser - For applica-
tions that require
fast turnaround time.
Star Micros Call
Ribbons Call
Cables Call
... and much more.

Memory Chip
(8 chips/set) \$ 18

DISK DRIVES

SPECIALS

Tandon
10 MB HD \$489
w/controller 669
Micro Science
10 MB HD \$519
w/controller 689
20 MB HD 669
w/controller 659

CDC 1800 \$129

Corvus HD Call

i-Image

Bermoulli Box Call

Tri Paks also Call

available Call

Maynard HD Call

Maynard Electronics

Maystream: Portable

back-up for HD

System 60 (incl

1 cntrlr card) \$1695

Contrlr Cds ea. 175

Cartridge 450' ea. 35

Cartridge 800' ea. 45

Mountain, Inc.

35MB HD w/ 27MB

tape back-up - or

35MB HD w/ 60MB

tape back-up

For more info Call

Hall High

Disk Drives Call

Tailgrass Call

(Wisconsin customers)

Tandon TM-100-2 Call

DISKETTES

SPECIALS

Ultramagnetics

5 1/4" DS, DD

(Box/10) \$ 25

BUY 3 BOXES, GET 1

BOX FREE

3M 5 1/4" DS, DD

(Box/10) \$ 30

DC 300 XL Cart.

tape 33

DC 600A Cart.

tape 39

Maxell

MD2-HD (diskettes for

IBM-PC-AT, Box/10) 69

Verbatim

5 1/4" DS, DD

(Box/10) \$ 30

MONITORS

SPECIALS

HGS
HX 12 RGB Color \$475

Amdak

300A Amber \$149

310A Call

300 Cir 265

500 Cir RGB 385

710 Cir 649

HGS

MAX 12E 179

Quadram

Quadchrome \$499

Quadchrome II 429

Amberchrome 175

Quadscreen Hi-Res. 149

Qanyo

8112 12" HR Green \$169

Taxan

Model 420L RGB \$499

Zenith

ULTRA HI-RES

MONITORS

HGS

Sr-12 (890

x 480 Pxls) \$638

Double Card

for SR-12 175

MISC.

SPECIALS

Key Tronic
KB 5151 \$161

Alpha-Delta

MACC 8 Surge

Protector \$ 69

Computer Accessories

Power Directors

P12 IBM PC \$145

P22 Stand Alone 75

Electronic Protection

Devices

Lemon / EC-I \$ 38

Lime / EC-II 55

Orange / EC-IV 75

Hauptage

8087 Chip \$149

8087 w/Software 255

80287 At Chip

w/o sft 269

Other Products Call

Innovativa

Filip n' File 5 1/4" \$ 22

Kanaling Microware

Masterpiece \$109

Key Tronic

KB 5151 Dvorse 189

Microsoft Mouse \$139

Mouse Systems

PC Mouse \$159

RH Electronics, Inc.

Guardian Angel Call

Power Angel (800W) Call

Titan Technologies, Inc.

PC Accelerator Call

Touchstone Technology

Touchstone II (addon

keypad for

the IBM) \$169

Verbatim

Head Cleaning Kit. \$ 18

Versa Computing

VersaWriter \$239

MODEMS

SPECIALS

Hayes
Smartmodem 1200S375

Hayes

Smartmodem 300 \$159

Smartmodem 1200B-369

Smartmodem 2400 Call

Novation Call

Quadram

Quadmodem II Call

Quad 5251 Call

Quad 3276 Call

US Robotics

Password \$309

PC &

ACCESSORIES

SPECIALS

Key Tronic
KB 5149
(Numeric Keypad) \$ 85

Keytronic

KB 5151 Jr. \$169

Quadram

Quad Jr.

Exp. Chassis \$479

Quad Jr. Exp. Mem

(for Chassis) 199

Tecmar

Jr. Captain

(128K, C.P.) \$315

Other Products Call



POLICY:

- Wisconsin residents add 5% for sales tax.
- Minimum \$4.00 for shipping, handling and insurance for orders to \$200.
- For orders over \$200, add 2 1/2% for shipping, handling and insurance.
- For cash prepayment of orders \$200 or more, add ONLY 2% for shipping, handling and insurance.
- Prices are subject to change without notice.
- All items subject to availability.

PCAD 100185

WE WELCOME:

- Visa, MasterCard and American Express (No charge for credit cards)
- Corporate, government, educational or volume purchasers, please ask for special accounts desk for additional discount
- COD (Add \$2.00 per box/parcel. Cash or certified check required)
- Checks (Allow 12 weeks for clearing)

INTERNATIONAL POLICY:

We welcome foreign orders. Shipping and handling charges per order are actual shipping costs plus \$50 int'l handling fee. Canadian orders - please call Telex 260181 ORYX SY5 WAU

WORKING HOURS:

Monday-Friday 8:30 - 6:00 • Saturday 10:00 - 2:00 • Central Time

Technical Support/Customer Service/Order Status: Call (715) 848-1374

CIRCLE 351 ON READER SERVICE CARD



Oryx Micro Supply
A Division of Oryx Systems, Inc.

CRAFTSMEN OF THE NEW TECHNOLOGY

425 First Street • P.O. Box 1961 • Wausau, Wisconsin 54401

Flying Lizards and Computer Paranoia

Computer paranoia is inspired by an industry aggressive enough to liken internal competition to war and incompetent enough to ship faulty, dangerous products.

I am talking about war," the professorial type at the bar of a dismal Paris computer show informed me. "International, worldwide, global war of forces much bigger than mere governments. It will not be pretty, *mon ami*."

I trotted out my dumb nod of pretended understanding, which, after 2 hours' sojourn in hitherto unexplored regions of the French language, had been honed exceedingly fine. Whatever he was getting at, at least it was *en anglais* and therefore more enlightening than the machine-gun French of the Hector computer representative who had just hectored me into listening to his plans for domination of the tripe-tart market (or so I understood).

Lizards and Shells

"There is the flying lizard and the crawling lizard," Le Professeur went on, "and there is the shell." Actually, he said *leezard* and *shall*, but anybody who speaks French the way I do is in no position to mock.

Why was I listening to this raving paranoid? Two days' growth of beard speckled his gaunt face. The terminally rumpled black suit dangling from his bones reeked of stale cigarette smoke. His tie was decorated with a new-wave pattern of sauce stains.

In other words, he was potentially the most reliable source in the hall. When you want the real dope on computer issues, you skip the guys with the 5,000-franc suits and million-franc smiles and talk to someone who looks as though he's just come back from a week in a Coney Island funhouse.

Le Professeur took a long pull on his stubby yellow cigarette, then blew the smoke at me. "The crawling lizard just plods along the beach. The flying lizard goes everywhere. He laughs at the crawling lizard. But the crawling lizard does



Stephen Manes

not enjoy the laughter. So maybe the crawling lizard learns how to fly!"

Le Professeur's English kept getting murkier with each sip of his pastis. "What about the shell?" I asked, hoping for some sudden miracle of clarity.

"The shell just sits and watches. It goes first this way, then that way. Sometimes it moves toward the flying lizard; sometimes it moves toward the crawling lizard."

I made a face.

"You do not understand yet? I thought you were a *beard*," said Le Professeur incredulously.

I scratched my facial hair in utter be-

wilderment at this remark.

"A *beard* soars above it all. And understands."

"Ah! A *bird*!"

Le Professeur winced at my pronunciation. "You are not as wise a *beard* as I imagined. Let me make it perhaps more clear. Let us say the flying lizard is AT&T and its friends—communications. Let us say the crawling lizard is IBM and its friends—information. Let us say the shell is Motorola and its friends. Believe me, there are many friends on each side all around the world."

Nobody Wins

My dumb nod turned into a glimmer of understanding. "Now you begin to see," said Le Professeur. "Perhaps you are a *beard* after all. This is the future, my friend. International, worldwide, global war. Telematique: communications. Informatique: data. For the whole world. Very high stakes—the highest.

"What are governments?" he asked rhetorically. "To information and communications there are no secrets. Governments—pah!" He dismissed them with a Gallic shrug.

"Then who will win?" I asked.

Le Professeur's face turned somber. "My friend, I am a man of Europe. I have lived in many different countries. War is a horrible thing. No one wins a war."

Titanic Battle

Okay, so the guy was a raving paranoid after all. Sure, IBM and AT&T were competing, but global war? I went

BRAVO!

For Value Line's New Investment Software.

"VALUE/SCREEN is a fast fundamental analysis screening package that can save you hundreds of hours in screening and analysis time... It is a powerful and flexible program..."
PC Magazine (July 10, 1984)

"I recommend this program to... anyone... who wants the ability to sift easily and rapidly through large amounts of monthly stock market statistical data."

Financial and Investment Software Review (January/February 1984)

"... saves me 2 days work per week."
Business Consultant, McAllen, Texas

"... it makes perfect sense that Value Line should have sought to boil down its database into a package that could run on a personal computer. This is just the kind of information that makes VALUE/SCREEN particularly valuable..."

Wall Street Computer Review (August/September 1984)

"It is so user-friendly, a complete idiot could operate it. It is almost impossible to make an error."
Money Manager, Carlisle, Mass.

"... I found the program interesting and useful..."
Computerized Investing (April, May 1984)

"With VALUE/SCREEN and my computer I can do months of tedious evaluations in a couple of hours a month. Instead of following only 20 or 30 stocks, I can follow over 1,000 in a moment's notice."
IBM Advanced Customer Service Representative, San Antonio, Texas

CIRCLE 142 ON READER SERVICE CARD



VALUE/SCREEN: The only investment software you'll ever need.

**Stock Selection * Data Disks
Stock Reports * Portfolio Management**

Get VALUE/SCREEN Today!

I want VALUE/SCREEN!

Dept 51GF01

- ☐ I'd like the \$39 trial offer, which includes complete documentation program disk, and a current data disk—PLUS the next monthly updated data disk
- ☐ I'd like an immediate 12 month subscription to VALUE/SCREEN with ☐ 12 monthly data disks for \$348 or ☐ 4 quarterly data disks for \$211.

Tax-deductible if used in managing your investments. Purchase is nonassignable. NY residents, add sales tax

Personal computer equipment.

- ☐ IBM Personal Computer
☐ Apple II Series, 80-column display recommended

- ☐ My check for \$ _____ is enclosed.
☐ Please bill my ☐ American Express ☐ MasterCard ☐ Visa

Account # _____ Exp. Date _____

Signature _____

Name _____

Address _____

City _____ State _____ ZIP _____

Value Line, Inc. 711 Third Avenue NY, NY 10017

**It's easy to make a copy.
It's quick.
It's illegal.
It's wrong.**

It's hard to believe.

People who wouldn't think of shoplifting a software product on their lunch hour don't think twice about going back to the office and making several illegal copies of the same software.

Making unauthorized copies of software is a violation of Copyright Law. Yet, the problem has reached epidemic proportions because many people are unaware, or simply choose to ignore the law. The software industry is urging decision-makers and software users to take steps to stop software piracy in their organizations. In the meantime, the industry has been forced to prosecute willful copyright violators.

There are legal, moral and economic imperatives forbidding theft of copyrighted software.

There is a free pamphlet on the subject. Call or write for a copy. A copy. A copy. A copy for everyone you know. Please ask for Priscilla.



ADAPSO
1300 North Seventeenth Street
Arlington, Virginia 22209
(703) 522-5055



COMPUTERS IN SOCIETY

my way and forgot the entire conversation.

Then IBM announced its purchase of a sizable chunk of MCI. Announcements of AT&T's new alliances in Japan and elsewhere quickly followed. The *New York Times* featured the story as "The Battle of the Titans," complete with charts labeled "IBM's Allies" and "AT&T's Allies."

International worldwide global war? Maybe not quite, but I wouldn't mind running into a few more mad geniuses with ruffled suits and fantastic stories. Today's paranoia, apparently, may well be tomorrow's gospel.

Bipolar Worries

What's particularly frightening is that the more you learn about computers, the more likely you'll begin to get paranoid about them. What's particularly ironic is that computer paranoia develops from two utterly opposite poles: On the one hand, fears that the machines will do their jobs too well; on the other, fears that they won't do their jobs at all.

The scenarios banded about most often come, like *Le Professeur's*, from worries about exceptional competence. There's no trick in extrapolating such fantasies from personal experience. A single fixed disk, as I've noted before, may well contain not only your personal financial data, but also your most intimate thoughts and even a calendar of your every move for the past year or so. Somebody who manages to get his hands on it is likely to learn things you'd rather he didn't.

With the advent of laser disk CD-ROMs, a record of your entire life—literally every important transaction you've ever made, financial and personal—could easily be stored in a shoebox. Considering the wealth of information you routinely transmit over the nation's communications networks, the concept of privacy becomes an increasingly unlikely fiction. Could AT&T call up every disparaging reference you've made to a particular politician? Well?

Too Much Paranoia

Such speculations are damnably difficult to confirm. Is the PR person I reach

To get a lot out of your printer, you need a lot of programs, right?

Wrong.
Sure, you could buy one package to change type sizes, another to create fonts, and still another to print sideways. Or you could get one simple program to do it all!

Printworks.™
It's loaded.

SoftStyle™

SoftStyle, Inc. 7192 Kalamianaoale Hwy Suite 205
Honolulu, Hawaii 96825 Phone (800) 367-5600
\$69.95. Enhances over 30 dot matrix printers, including
Epson and Okidata. IBM PC or compatible.



CIRCLE 514 ON READER SERVICE CARD

Operate your office PC from home ...



Use the power of your office-bound PC at home or on the road ... all you need is REMOTE.

Whatever PC power you may need, spreadsheet, DBMS, word processor, can be yours. All you need is a portable computer or terminal and a modem. REMOTE provides password protection for each user.

Leave your PC in the office ... but pack the power to go. REMOTE.

REMOTE™

MICROSTUF®

1000 Holcomb Woods Parkway / Roswell, Georgia 30076

CIRCLE 212 ON READER SERVICE CARD



Call for programs not listed

Technical & Other info. (602) 246-2222

TOLL-FREE ORDER LINE 1-800-421-3135

SOFTWARE

DATA BASE MANAGERS

Alpha Data Base manager	\$185
Clout 2	129
Condor III	269
Fox and Geller Quickcode	139
Fox and Geller Quickraport	139
Friday	159
Knowledgeman	225
K Paint	60
K Graph	135
K Text	135
K Report	135
Nutshell	55
PFS: File	78
Power Base 2.1	249
RBase 5000	339
Think Tank	95
Tim IV	219

WORD-PROCESSING

Leading Edges w/Marga	85
Microsoft Word	225
Multimata	210
Oasis Word Plus	145
Pashtext 5000	145
PFS: Write	78
Random House Spell Checker	38
Sanna Plus	365
Sanna III 3.0	275
Volkwriter Deluxe	139
Word Perfect 4.0	195
Wordstar	170
Wordstar Propec	240
Wordstar 2000	236
Wordstar 2000+	285

SPREADSHEETS

Microsoft Multiplan	110
PFS: Plan	78
Supercalc II	145
Supercalc III	159

ACCOUNTING

BPI Accounts Payable	299
BPI Account Receivable	299
BPI General Accounting	299
BPI Payroll	299
Cyma	Call
Dollars and Sense	95
MBSI	Call
Tobias Managing Your Money	95

TCS Big Four equivalent of Peachtree Series 4 - Specially augmented and customized for your IBM PC Terminal and Printer - GL, AR, PA, AP, CP/M-80, CP/M-86 for PC XT, DOS 1.1, 2.0.
Each Module \$65 For All Four \$249

INTEGRATED

Enable	Call
Smart Software	495

TRANSFER PROGRAMS

Crosstalk XVI	90
Hayes Smartcom	88
Move-It	79
Ramota	100

SOFTWARE

GRAPHICS

Chertmestar	\$239
Dr. Halo	85
Enargraphica w/o Plotter	189
Enargraphica w/Plotter	279
Fontrix	99
Graphwriter/Combo	325
Microsoft Flight Simulator	32
PC Paint Brush	69
PFS Graph	78
Signmaster	175

LANGUAGES

Concurrent PC/Dos	179
CP/M 88	35
Fortran 77	208
Lattice C Compiler	245
Lattice Run C Interpreter	89
Microsoft Basic Compiler	225
Microsoft C Compiler	239
Microsoft Fortran	210
Microsoft Macro Assembler	89
Microsoft Pascal Compiler	185
Multil Halo	140

PROJECT MANAGEMENT

Harvard Project Manager	199
Microsoft Project	150
Total Harvard Project	255

UTILITIES

Copy II PC	22
Copyright	45
Norton Utilities 3.0	52
Prokey	79
Superkey	39

HARDWARE

BUYS OF THE YEAR

Expansion Board 0 to 576K	\$69
KB5151 Keyboard Equivalent	89
Hercules Graphic Board	
w/Par Port Equivalent	118
1 Year Warranty - 30 Day	
Return Privilege	

MODEMS

Anchor Express	245
Hayes 1200	Call
Hayes 1200B	Call
Hayes 2400	285
Promodem 1200B	595
Promodem 1200	309

RAM

64K 150NS Chips (Set of 9)	4.95
256K Ram Chips (Set of 9)	39.50

BOARDS

AST Advantage	385
AST Slipack w/864	249
Hercules Color Card	149
Hercules Graphics Card	275
Paradise Five Pak w/64K	165
Quadram Board with Par/Ser	
and Game Port	199
Quadcolor I	185
Sigma Maximizer Multifunction	189
Sperly 512K Expansion w/128K	145

HARDWARE

STB Chauffeur Board	\$255
STB Mono Board	155
AB Print Switch	75

COMPUTERS

Sperry PC Mono 256K Dual Drive	
Serial Port, Clock, MS/DOS 2.11	
	1650

IBM PC-AT	Call
-----------	------

PRINTERS

FREE! PRINTER SET SOFTWARE	
Purchase an Okidata, Epson, Gemini, Citizen or Toshiba printer and receive at no charge a menu driven program to set print characteristics or to make your computer function as a correcting typewriter. Retail value \$35. Available for most disk formats.	
CITIZEN	
MSP-10	275
MSP-15	Call
MSP-20	425
DAISYWRITER 2000	795
EPSON - Call on all models	
OKI	
Juki 6100	349
Juki 6300	685
Juki Tractors	120
NEC	
3550	1009
8850	1349
P2 Parallel	525
P3 Parallel	725
OKIDATA - Call on all models	
PANASONIC	
1091	258
1092	Call
1093	515
KXP3151	455
SILVER REED	
EXP 400P	235
EXP 500P	289
EXP 550P	399
EXP 770P	699
STAR MICRONICS	
SG-10	229
SG-15	369
Call for prices on other models	
TOSHIBA	
1340	540
P351	1020

MONITORS

AMDEK	Call for price
Taxan 425	399
Taxan 121 Green	125
Taxan 122 Amber	134
Princeton HX-12	449
Princeton Max 12E	179

TERMS: Prices include 3% cash discount. Add 3% for charge and C.O.D. orders. Shipping on most software is \$5.00. AZ orders +6% sales tax. Personal check - allow ten (10) days to clear. Prices are subject to change.	
--	--



TOLL-FREE ORDER LINE 1-800-421-3135

WAREHOUSE DATA PRODUCTS

2701 West Glendale Ave. • Phoenix, AZ 85021



out and touch at AT&T really going to tell me. "Yes, you're absolutely right. We have been digitizing every phone conversation every American has made over the last 10 years, and we've got it indexed by embarrassing subject. Of course, we're a responsible company, and we'd never use this information for anything unethical or illegal. And if you mention a word of this, we have some items your girlfriend would kill for."

Is any electronic mail vendor going to admit, "Yeah, despite our rudimentary precautions, your correspondence is really open to anybody in our firm who's got a cerebellum. A couple of smart cookies just retired to Bermuda after making a killing on inside information they swiped."

But since there's no way to prove a negative, such ideas are even harder to deny. Those who remember scoffing at some of the more fantastic "paranoid delusions" of the Vietnam War era (Of course, the government wasn't spying on its own citizens) find such denials exceedingly unconvincing.

And there's certainly no denying the potential of mischief involving electronic information. Still, such paranoia theories run into the simple problem that competence is rare.

Yes, somebody may be snooping through your electronic mail, but that person will have to go through an awful lot of boring memos to find one worth filching. Sure, somebody may be monitoring your every move, but he'll probably get drunk and tell some reporter about it. On the other hand, if you're accessing the Dow Jones "Movie" database on your boss's time, I would bet my backup tapes that, given the desire to do so, the boss could find out.

Stupidity and Error

For me, the paranoid scenarios assuming competence aren't half as scary as the ones assuming the more common qualities of stupidity, greed, and error. Most hardware and software I see have subtle (or even blatant) glitches its designers missed. This does not, it seems to me, bode well for bigger, more complex systems like the ones underpinning our national finances and defense.

COPY II PC™


• BACKS UP PROTECTED SOFTWARE

The backup insurance you need to protect your software investment. COPY II PC makes a floppy backup of most* protected software quickly and easily.

• RUNS PROTECTED SOFTWARE FROM YOUR HARD DISK

COPY II PC makes using your hard disk as convenient as it should be. No longer will you have to keep your floppy disk in drive A with some of the most popular business software - call for current list

Minimum Requirements: IBM PC, XT, AT, 256K jr and some compatibles.
One or two disk drives. 64K on most machines.

Call M-F 8-5:30 (W. Coast time) with your  : 503/244-5782.
Or send a check (add \$3 s/h, \$8 overseas) to



\$39.95

CENTRAL POINT Software, Inc.
9700 SW Capitol Hwy. #100
Portland, OR 97219

We update Copy II PC regularly to handle new protections you as a registered owner may update at any time for 1/2 price* (To update, just send original disk and \$20)

This product is provided for the purpose of enabling you to make backup copies only

CIRCLE 152 ON READER SERVICE CARD

PC power ... anywhere.



REMOTE lets you use all of your PC software from the other end of a telephone line ... wherever that might be!

All you need is a terminal or portable microcomputer, a modem, and a phone line. You can call into the host microcomputer, access it, and run most popular programs, including word processors, spreadsheets, and database managers. You'll see the program in operation just as if you were sitting in front of the host computer.

REMOTE's powerful electronic mail system rivals those found on mainframes, with full password protection. Why leave your PC power in the office ... when you can give it a call with REMOTE?

REMOTE™

MICROSTUF®

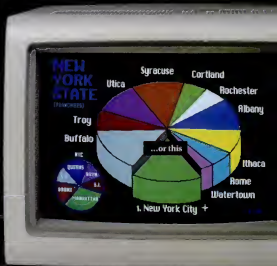
1000 Holcomb Woods Parkway / Roswell, Georgia 30076

CIRCLE 213 ON READER SERVICE CARD

With AST A Little More Money Buys You A Lot More Color



The Graphix Partner™ with a standard color card



The Graphix Partner with AST's ColorGraphPlus™

Announcing the more colorful color card—ColorGraphPlus. Don't settle for dull, lifeless 4 color graphics. AST's ColorGraphPlus color card offers up to 16⁺ sharp, vibrant colors in the standard 320 x 200 resolution—for about \$50 more than you'd expect to pay for an ordinary color card.

In the high-resolution 640 x 200 mode, ColorGraphPlus gives you up to 4⁺ full colors. Other color cards offer only black and white.

There's more. ColorGraphPlus features our memory expansion option—allowing you to add even more colors—for up to 8⁺ vivid colors in the high-resolution color mode.

We've also included a Parallel Port as standard on ColorGraphPlus, making printer and plotter connec-

tions easy and convenient. And there's a software switch, providing compatibility with our Preview!™ graphics card.

Complete IBM® color card compatibility. ColorGraphPlus runs all the software designed for IBM's color card in the same resolutions, with at least as many colors. And many of those application programs already support ColorGraphPlus' additional color capabilities, including some of your favorites like Symphony™ by

Lotus® PC Draw,™ Graftalk,™ Business Graphics Systems,™ Graphix Partner—as illustrated above—and many others. **AST—number one in PC enhancements.** Because ColorGraphPlus is from AST, you're guaranteed first class quality, service and support for evolving color standards. Extensive

testing and comprehensive burn-in procedures ensure the product satisfaction you expect from the industry leader. And each ColorGraphPlus card is backed by AST's one year warranty. An optional two year warranty is also available.

To get the most color from your display monitor call our Customer Information Center (714) 863-1333. Or write, AST Research, Inc., 2121 Alton Avenue, Irvine, California 92714 TWX: 753699 ASTR UR.

Phonetic of displayable colors is software dependent. ColorGraphPlus and Preview! trademarks of AST Research Inc. The Graphix Partner trademark of Graphix Partners and Company Ltd. IBM registered trademark of International Business Machines Corporation. Lotus registered trademark of Lotus Development Corp. PC Draw trademark of Micrographix. Business Graphics Systems trademark of Business Graphics Systems. Graftalk trademark of Graftalk Group Inc.

AST
RESEARCH INC.



COMPUTERS IN SOCIETY

Take the recent space shuttle experiment with a Star Wars laser defense system. With the whole world watching, some crack programmers managed to send data to the shuttle in feet instead of nautical miles, thereby causing the shuttle to aim a mirror at a mountain 10,023 miles high. Apparently nobody bothered with data limits; I can just hear some programmer saying now, "Gee, we didn't think it was worth writing all that boring extra code."

Undoubtedly the same mistake won't be made next time; that's the purpose of testing. But it remains a trifle unsettling to think that a missile somewhere in Iowa may one day end up in my kitchen because some junior programmer waited till next time to make the latitude and longitude of my apartment out of bounds.

Flunking Tests

As software and hardware get more and more complex, it may well be unreasonable to assume they can be tested fully; certainly the business incentive is not to bother trying. Intel apparently shipped buggy 8088 chips for 3 years before fixing the problem; many found their way into early IBM PCs, including mine. Texas Instruments and other major outfits managed to ship a whole lot of improperly tested and possibly defective chips that are now in all sorts of American defense systems. The armed forces have responded by demanding extended warranties for products containing the mystery chips. If a missile lands on your roof, call toll-free for the number of your nearest authorized service center.

Data processing professionals I respect have told me hair-curling horror stories about practices they've run into at firms ranging from banks to defense contractors. Start thinking about such things and you may not want to wake up in the morning.

Or you might want to move to the space shuttle, where NASA's multiple-redundancy policies always seem to keep snafus manageable. But then you might remember a remark I seem to recall one astronaut's having made back in the early days of space flight: "I keep thinking that all this was built by the lowest bidder."



Coup D'etat

AT&T Computers are taking over the P.C. world.

That's because AT&T makes multi-user, multi-tasking micro computers that are 2 to 3 times faster with greater memory capacity than comparable IBM machines.

At Computer Integration Associates we make AT&T Machines even better. We're AT&T's Largest VAR. We sell all AT&T machines; the PC 6300, Unix PC and 3B series of micro-computers and all AT&T compatible hardware and software. • Add-On Mass Storage Systems • Tape Backup Systems • Networks-Including

Starlan • Application Software Including Communication Software • Custom Vertical Software • And Much More. We can set up complete office systems, upgrade your present system, and also design software to your specific needs.

Rely on us for expert technical advice, constant availability and low prices on all AT&T machines and compatibles.



Computer
Integration
Associates

725 Airport Road, Lakewood, NJ 08701
(201) 370-3900

CIRCLE 150 ON READER SERVICE CARD

System service by REMOTE control.



System troubleshooting's enough of a headache without adding travel to it. REMOTE can cut your service travel ... to nothing flat.

REMOTE lets you access and operate a distant system via modem. You can troubleshoot the system from top to bottom, update or revise software and data files ... all without leaving your office!

Boost your system support efficiency and your bottom line ... all you need is REMOTE!

REMOTE™

MICROSTUF®

1000 Holcomb Woods Parkway / Roswell, Georgia 30076

CIRCLE 214 ON READER SERVICE CARD



IBM's most powerful PC word

**IBM DisplayWrite 3.
For small jobs to big ones,
from PCs to mainframes.**

Whether you're the writer or the typer or both, how you put words to paper should be limited only by your needs, not by your tools.

Which is the whole idea behind IBM DisplayWrite 3.

It's the latest PC version of IBM's DisplayWrite Series; software that works with a variety of IBM office systems.

So it not only turns your PC into a powerful text processor, DisplayWrite 3 goes beyond your PC.

It lets you exchange documents with a big computer, like a properly equipped

IBM mini or mainframe.

DisplayWrite 3 is "menu-driven" to make learning fast and straightforward.

It lets you do all the expected things, like centering and justifying and moving text every which way.

Plus a number of highly unexpected things, such as automatic outlining and footnoting.

You can edit parallel columns of



processing ever? That's the whole point.

text, then re-edit without a lot of re-thinking.

You can print one document while you work on another.

You can produce form letters that seem more like personal letters.

You can check your spelling (with the help of a built-

in dictionary) while you hyphenate and paginate in one pass.

You can even process numbers. DisplayWrite 3 can add, subtract, multiply and divide.

And if, after writing an important proposal, you need to change your product's name from Sudso to Sudsy in 156 places, you can, automatically.

To learn more, call your IBM mar-

keting representative, or visit an IBM Product Center or Authorized IBM PC or Software Dealer.

For the store nearest you, and a free brochure, call 800-447-4770. (In Alaska call 800-447-0890.)

IBM

Personal Computer Software



Cranium



Thought Processor



DESIGN TOOLS FOR THE PC

OUT WITH THE OLD WAYS, IN WITH THE NEW. PC MAGAZINE HELPS YOU UPGRADE YOUR GRAPHIC DESIGN OPERATIONS WITH REVIEWS OF SIX SYSTEMS ESPECIALLY SUITABLE FOR BUSINESS.

In today's design-driven society, large corporations, small businesses, government and nonprofit institutions, and community groups all rely on visual communication to convey vital information. The impact of the visual message cannot be underestimated. Graphically designed advertisements, annual reports, brochures, presentations and animations, flyers, and posters do more than communicate facts and figures; they make and shape a company's public image.

But securing high-quality graphic designs

can put a substantial dent in a company's budget. For the majority of businesses, an in-house design department is a luxury. And, while an outside company can produce beautiful results, its ability to meet your needs at a competitive price may depend on how deeply it has submerged itself in computer graphics.

A growing number of microcomputer product manufacturers offer another alternative: graphics systems for the IBM PC. Some of these are simple computerized drawing and coloring tools that are good introductions to computer graphics. Others put the power of the PC at the disposal of the artist, competing with mini and mainframe-based systems in cost-effectiveness. Sometimes these packages



consist solely of software, although in most cases boards, displays, mice or digitizing pens, output devices, and even video cameras are also included.

To compare the different types of offerings and their features in a significant context, *PC Magazine* selected six representative graphics packages currently on the market. We closeted six artists in our lab for 3 to 5 days, each with one of the six programs. (See artists' biographies accompanying each review.) Their task was to learn the package, use it to create an advertisement and a logo, and form an opinion of the package's potential usefulness.

We gave each artist this assignment:

CompuKids is a new software company recently incorporated by a group of prodigies, all younger than 16. The company has recently introduced its first product: a new "thought processor" that helps users organize and polish formal business reports. You must come up with an image of quality and reliability that will capitalize on the uniqueness of the company without any "cuteness."

You should include the phrase "Cranium by CompuKids." Since the ad is slated for *PC Magazine*, it should be geared to an adult business reader.

You should also try to copy the CompuKids logo as closely as possible. It may appear on the ad or separately.

The task of creating the advertisement gave each artist a means of demonstrating the range of the package he or she was using. And while it is difficult to test all the facets of a graphics system in a limited time, the artists' experiences can give you a solid basis for evaluation.

Graphics software on the PC offers new design possibilities and greater control over the final product. These systems can help you graphically enhance your organization's public persona. ■

NUMBER NINE STARTS A REVOLUTION

THE REVOLUTION SERIES OF PC GRAPHICS ADAPTERS SETS NEW STANDARDS FOR HIGH RESOLUTION AND AVAILABLE COLORS.

Although IBM is a leader in the computer industry, it has not led the way in computer graphics. Serious computer graphics users require high resolution and a wide range of colors for image clarity—needs that IBM is not fulfilling, even with its Enhanced Graphics Adapter and Enhanced Color Display. Number Nine Computer Corporation recognized this lack and stepped in with products that have started a revolution.

Number Nine's REVOLUTION series of powerhouse single-board PC graphics controllers are truly revolutionary in every way—from speed to programming ease to compact design. Some of the plug-in boards are capable of 1,024×1,024 resolution and a potential 16.7 million colors. The output of these boards is an analog RGB (red, green, blue) signal as opposed to IBM's TTL (transistor-to-transistor logic) signal. Also available is NTSC (National Television Standard Committee) compatibility, which allows your PC to interface with composite video or television monitors. The most significant application area for NTSC compatibility is in the broadcasting industry. A PC could be a front-end system generating titles to overlay a live or taped video image. You could send the NTSC signal from your PC with a Number Nine graphics controller to a studio

mixer, which would merge the signal from a video source with your signal.

Three graphics systems that *PC Magazine* tested use the REVOLUTION series: Time Arts's *Lumen*, Chorus Data's *Imigit Plus*, and West End Film's *Artwork*. Unlike most graphics adapters, which allow either high resolution and few colors, low resolution and many colors, or somewhere in between, the REVOLUTION board used in testing the packages combines high resolution with many colors—512×512 by 8-bit plane resolution and 256 displayable colors.

This sharpness and color does not come cheap. The REVOLUTION basic configuration lists for \$1,995. This price is high, but if you are a serious graphics user, you will find that the quality produced with a REVOLUTION board is far better than that of the IBM EGA.

So many manufacturers and software developers use the REVOLUTION boards that you can rest assured that purchasing any one of the boards will be money well spent. And the REVOLUTION boards are compatible with so many graphics software packages that you can easily switch packages without hardware-configuration problems. This "transportability" is a big plus when generating graphics. Your needs may extend from CAD (computer-aided design)

applications to freehand drawing to video imaging. Each need may require a different graphics package. Changing from one package to another with a REVOLUTION board usually requires no more effort than changing software. The basics are already in your system—analog RGB monitor, expanded memory, input device, and the CPU.

Last April, Number Nine introduced an enhanced REVOLUTION board with a resolution of 512×512 by 32-bit planes deep. What can 32-bit planes do for you? Get this: 256,000 simultaneously viewable colors from a palette of 16 million. We have yet to see application software for this board, but Number Nine says that Artronics, Media Cybernetics, and others are working on high-resolution application programs. *PC Magazine* will look at these programs as they become available.—Gay Heather Luchak and Gerard Kunkel



REVOLUTION series
Number Nine Computer Corporation
691 Concord Avenue
Cambridge, MA 02138
(617) 492-0999
List Price: 512×8, \$1,995; 512×32, \$3,995;
1,024×8, \$3,995 (\$2,995 for a 640×480
noninterlaced version).

CIRCLE 666 ON READER SERVICE CARD



VECTRIX'S PAINTPAD

**VECTRIX'S VX/PC GRAPHICS HARDWARE SYSTEM
FEATURES A PALETTE OF 16.8 MILLION COLORS. BUT THE
PAINTPAD SOFTWARE ONLY LETS YOU IN ON 4,096.**

No one expects Twinkies to be anything more than they are: yellow fluffy cakes with white fluffy cream imprisoning an ounce or two of air. But when an upscale bakery offers a concoction made with "the freshest eggs and sweet, creamery butter" and it tastes like Twinkies, the customer is usually a bit miffed.

The Vectrix *PaintPad Video Art Software* is in the same no-win situation as the fancy-bakery Twinkies. It is a respectable, middle-range artistic graphics package, offering a nice, if not complete, variety of functions. However, *PaintPad* is built around the Vectrix VX/PC color card set, a pair of powerful boards that could potentially support software sophisticated enough to be any artist's gourmet delight. *PaintPad* simply doesn't tap into the full power of the Vectrix hardware.

The Vectrix Corporation's standard VX/PC card set consists of a memory board and a processor board connected by two ribbon cables. These boards, which you will need to install in two adjacent slots, replace any other color graphics card in your PC or XT. The standard card set will generate 4,096 colors. An enhanced set, which includes a third piggyback board, can generate an astounding 16.8 million colors.

The total system requires an RGB analog monitor with a resolution of 720 × 512, which is available for purchase directly from Vectrix. If you like, you can also attach a monochrome monitor to your system for use when you bring up the system and check directories.

You communicate with the *PaintPad* software through a digitizing pad and a mouse or stylus. Vectrix has drivers for the Kurta, Summagraphics, and Hitachi tablets; in *PC Magazine's* test, the reviewer used the Kurta.

PaintPad's main menu consists of a grid of icons each indicating a function; some functions also have iconographic subfunctions. Strangely, the green-and-

purple menus have a visible low-resolution roughness to them, although they are in a 740 × 512 pixel format. The crudely drawn images in the menus don't give any hint of what the software can do and instead introduce *PaintPad* as if it were a low-cost children's package.

Middle-of-the-Road Abilities

The functions that *PaintPad* offers are, for the most part, well thought out. For ex-

**PaintPad's zoom
feature doesn't just
magnify your drawing
to one standard large
size; you can choose
from 16 magnification
factors to enlarge your
drawing.**

ample, the circle function lets you change the diameter of the circle by pulling the mouse to the bottom of the digitizing tablet to shrink the diameter and pushing the mouse toward the top of the pad to enlarge it. The triangle function has the same feature and also lets you rotate the triangle, an unusual ability. With a rectangle, you can "rubberband" the shape by pulling on one side.

An airbrush function allows you to choose the size of the area you want sprayed. The smallest airbrush diameter, the size of a few pixels, simulates real-life sketching better than the line function does since it creates a dotted, variable line rather than a solid one.

The rubber-stamp feature works very well for repositioning elements you've already drawn. You demarcate the section that you want copied by enclosing it in a rectangle, then you move it to its new position. A cut-and-paste feature works in a similar fashion.

PaintPad's zoom feature doesn't merely magnify your drawing to one standard large size; you can choose from 16 magnification factors to enlarge your drawing: The smallest is 4 times the normal size, and the largest 256 times normal. Nearly all the other functions work while you are in zoom mode, an excellent feature. The related pan feature gives you an ant's-eye view, letting you move across the out-sized pixels from one portion of the screen to another.

This list of features is certainly impressive, but there's a lot left out. While there's a circle function, there's no way to construct an ellipse. There's no way to automatically shade objects. Nor is there an undo function for canceling your most recent alteration.

A Lush Color Array

Most high-end graphics systems offer 256 colors; *PaintPad* has 512, all of which can be used in a single image. These hues have been preselected from among the 4,096 possible colors in the standard VX/PC color card set. However, an artist who also has some programming expertise can gain access to the full array of available colors (16.8 million with the piggyback card) by studying some BASIC program listings that Vectrix has printed in the hardware system manual.

You can gain access to the 512 colors available in the program simply by calling up the default palette, which displays the hues in a series of small color squares. You can continue to use the default palette as it is, but of course, if you want to use only a certain subset of colors, the program allows you to change all the unwanted color

squares into duplicates of the colors you are currently using. *PaintPad* will save this customized palette with each image. You can also duplicate a color you've already used in your image by clicking a mouse button when you're on the color-selection menu.

PaintPad also gives you a second way to select colors with color-mixing bars at the top of the palette menu screen. These three outlined bars are designated R, G, and B: the primary color components in light. Whenever you select a color from the color-selection menu, the color-mixing bars display the proportion of red, green, and blue in each color you have chosen. You can then use these bars to adjust a color mix. Setting the cursor at the left end of, say, the red bar will remove all traces of red from the final color mix, while setting the cursor at the right end will mix red in at full intensity.

Humdrum but Functional Menu

PaintPad's main menu can be enhanced by the help function. When you select help (a question mark icon), then move the mouse to another function and press the activator button, a succinct description of that function appears on screen.

Vectrix placed the icon menus on a separate screen rather than in a border on the drawing screen. This method certainly gives you a much larger canvas, but the tradeoff is that you have to toggle back to the icon screen every time you select a new

drawing tool.

The only time the program lets you routinely bypass the icon screen is when you switch between the image you are currently working on and the color-selection

**Whenever you select a
color from *PaintPad*'s
color-selection menu,
the color-mixing bars
display the proportion
of red, green, and blue
in each color you have
chosen.**

menu, which appears in the upper-right corner of the digitizing tablet.

Cleaving Palettes

The artist who tested this program for *PC Magazine* was Tom Christopher (see "About the Artist"). Once he began creating his image, he discovered that the color-mixing bars and the palette overlay the top and bottom of the working image. This overlay made it difficult to see how the colors changed in the obstructed parts of the

image. In addition, you can't "go underneath" the palette and color bar overlays to choose colors from that part of the image. Instead of reserving so much image-limiting screen space for the color-selection menu and color-mixing bars, Christopher said Vectrix could have allowed you to scroll the image up and down far enough to see and have access to its upper and lower edges.

A Matter of Consistency


Another problematic aspect of the program that Christopher felt should have received closer attention was the "disappearing" cursor. If you are using your cursor as a drawing tool, and you press a button without moving the mouse, the cursor disappears. You have no way of knowing where you are in your drawing—until you move the cursor to an area with a different pattern, at which point you will suddenly find yourself erasing every item in your path. The only way to avoid wreaking this kind of artistic havoc is to release the mouse's activating button whenever you are not in the immediate vicinity you want to work in. Taking this precaution would force you to toggle the button frequently as you work. "Vectrix could have made the cursor nonblinking when it's not active," commented Christopher, "and had it blink when you press the button so that you can see exactly where you are."

By contrast, Christopher found *PaintPad*'s text function so easy to use that he was able to add "Cranium by Compu-Kids" (see "Design Tools for the PC") to his illustration in just a few minutes. The icon submenu clearly indicates how to select one of eight font styles, including script, gothic, and italic. You can then fill the letters with color or leave them open. You can make the characters almost too small to read, large enough for a letter to fill the entire screen, or any size in between.

In addition, you can rotate the text an entire 360 degrees. This unusual flexibility significantly expands your text-placement options.

Loaded with Potential

The Vectrix VX/PC color card set has the juice to run a very powerful graphics software system, but the Vectrix *PaintPad*



PaintPad Video Art Software
VX/PC Color Card Set
 Vectrix Corp.
 2606 Branchwood Dr.
 Greensboro, NC 27408
 (800) 334-8181 (919) 288-0520
 List Price: *PaintPad* \$2,495; standard hardware, \$500; enhanced hardware, \$2,995.
 Requires: 256K RAM, two double-sided disk drives or one disk drive and a hard disk, analog RGB monitor, digitizing pad, and a mouse or stylus.
 Color Maximum: standard, 4,096; enhanced, 16.8 million.
 Resolution: 712 × 512 pixels.

CIRCLE 700 ON READER SERVICE CARD

Video Art Software doesn't take advantage of the hardware's capabilities. However, Vectrix has opened up its hardware to programmers who want to fully use it. The hardware manual indicates how to manipulate colors and how to animate images in several high- and low-level languages. A Vectrix representative pointed out that the *PaintPad* would be useful to scientists who want to digitize photographic images, then highlight certain features by altering or brightening their color. Yet this capability would be enticing to many artists as well if it were a permanent, automatic part of the program.

PaintPad could have taken further advantage of the hardware by using the optional monochrome monitor more fully. Displaying the menus on a second monitor would eliminate the time wasted switching between the menus and the image, and you would not have to lose sight of the work in progress.

With these limitations, the *PaintPad* software is not the best choice for graphic designers. It is better suited to engineers and scientists who would be comfortable modifying and extending the software. As Christopher says, he'd love to have the advanced features to play with, but there's no way he's going to program them himself. "Graphic design software should cater to your average artist who doesn't know how computers work. If you were given *PaintPad* to use as your computer-art tool, and you were an artist, an engineer, and a skilled programmer all in one—then you could do it."

ABOUT THE ARTIST

Tom Christopher graduated from the Art Center College of Design in Pasadena, California in 1979 and went on to do poster design for CBS Records. His varied art career includes a stint at CBS News, where he did courtroom drawings for the Jean Harris, ABSCAM, and Brinks robbery trials; coverage of the 1984 Summer Olympics for ABC Sports; and a software/book package entitled The MacArt Dept. for Simon & Schuster. His most recent show was at New York City's Eastman-Wahmendorf gallery.



To create the hands in his *CompuKids* illustration, artist Tom Christopher used *PaintPad*'s freehand line-drawing function. He shaded the hands by using the smallest circle as a brush, filling areas with solid color, and airbrushing one color on top of another. He found the zoom feature excellent for working on details of the hands, since it can magnify a segment of a screen by 1 of 16 increment factors.

Christopher used straight-line functions and basic shape functions to create most of the table top, as well as to design the *CompuKids* logo in the lower-right corner.

A text function allows for positioning, sizing, and rotating the eight software fonts.

The Vectrix icon menus as well as the 512-color palette are on separate screens from the drawing area.



PC PAINT

**PC PAINT OFFERS QUALITY FEATURES
IN A SOLID, LOW-END GRAPHICS PACKAGE
WITH PLENTY OF DRAWING FUN.**

PC Paint is an art supply store in a box, packaged and ready to go. It has pre-conceived, predesigned functions that you can use to design graphics even if you have only a modicum of drawing ability. And *PC Paint* is fun too.

As befits a low-end graphics system, *PC Paint* doesn't need much extra additional hardware and software. It runs on any version of the PC with 256K and DOS 2.x. It requires a Mouse Systems or Visi-Corp mouse and pad and a color/graphics adapter that gives a resolution of 256×256 pixels. If you like, you can attach an IBM Graphics Printer or one of several Epson or Okidata printers to the system.

Martha Gradisher, the graphic artist who tested this package (see "About the Artist") found that using a mouse to draw on the computer screen with *PC Paint* did not allow her the fine control she has with a pencil. The difference between hand and computer dexterity was most apparent when she used the pencil function. The line often appeared as much as a quarter of an inch away from where she had positioned the cursor because the contact points in the glass digitizing pad are set farther apart than the pixels on the screen. Said Gradisher, "It's like trying to draw with a rollerskate on your hand."

Because of this limitation and the low

screen resolution, Gradisher abandoned her paper-and-pencil method. Her typical drawing approach involves sketching an image, then using color to shape and shade it. With *PC Paint*, however, she found it more effective to layer geometric shapes on-screen, fill them with color, and then shade them with the patterns.

A Basket of Goodies

PC Paint presents all of its functions on a border around the drawing area. The left border displays the icons for such basic drawing tools as the pencil, spraypaint, and paintbrushes. You can use the geometric shapes shown on this menu as outlines to fill with solid color or pattern.

Your colors appear in a color bar on the right of the screen. You have a choice of six palettes, each with three colors, and you can fill the background with a range of 16 colors and intensities.

Twenty-two patterns are arrayed along the bottom border. *PC Paint* offers a variety of dots, stripes, grids, and lattice-works. These patterns work together extremely well. You can choose a paintbrush, a color, and a pattern and start painting right away. You can then invert the two colors in the pattern or select a new color. You can keep the color and change the pattern or use the spraypaint function

or a filled shape instead of the paintbrush. *PC Paint* is quite a versatile package.

At one point, Gradisher had drawn images of paper and wanted to shade the pages so that they would appear three-dimensional. She did this with several patterns in light blue. By "spraypainting" the patterns onto the paper, she was able to give the shading a more jagged, amorphous quality. This spraypaint feature is especially useful because it doesn't completely fill the pattern or color that is beneath it. At one point, Gradisher spray-painted red dots onto a white background, and then lightly spraypainted light-blue dots on top of them; the effect was dazzling.

The top border contains command menus. The file menu saves and loads picture files, and the font menu lets you select one of six font types and indicate the size of the letters in the text.

The edit menu lets you edit your image. There are commands for undoing the last change and for erasing a section of the screen. You can duplicate or move sections of your picture on-screen, and you can copy in part of an image from another file.

The tool menu lets you change palettes and paintbrushes and enables you to magnify a portion of your picture in case you want to work in smaller detail.

Trying to Get a Full View

Although the menus permanently border the drawing area, your images can still take up the entire screen. A view icon temporarily removes the menus so that you can see the full screen. Since you can only work on a picture while the borders are in place, a scroll icon will push the image vertically or horizontally. Another way to see the entire image is to print it, and the print icon makes this job as easy as touching a mouse button. Placing the icon borders over portions of the image screen represents a compromise in any graphics package: It's easy to choose a new function when the icons are inches away, but working on an image when you can't see all of it takes some getting used to.

Although using the full screen for your picture is cumbersome, nearly every other aspect of *PC Paint* is simple. The program has nifty ways of indicating where you are

PC PAINT FILE



PC Paint

Mouse Systems
2336H Walsh Ave.
Santa Clara, CA 95051
(408) 988-0211

List Price: \$99

Requires: 256K RAM, DOS 2.x, one double-sided disk drive, color/graphics adapter, Mouse Systems or compatible mouse and pad.

Color Maximum: 16 in 6 preset palettes.

Resolution: 320 × 200

CIRCLE 696 ON READER SERVICE CARD

at all times. The program alters the shape and color of the cursor for different modes; a pencil-shaped cursor in pencil mode, and so forth. The width of the paintbrush is represented on-screen by a dot or blob of the same size.

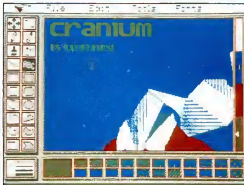
PC Paint also tells you which function you are using. The icon box for the geometric shape you are using will have a contrasting background, and your current pattern appears in a special box. Commands are checked off as they are used.

With so much guidance on the screen, it is certainly possible to find your way around *PC Paint* without reading the manual. But it is worth taking time to look at it. A perfect complement to the software, it presents each aspect clearly and graphically, and it'll save you a lot of guesswork.

Wrapping Up the Package

Gradisher found *PC Paint*'s limitations too constraining to fully develop her illustration ideas. She commented, "I couldn't find a way to do what I wanted to do, so I did something different."

But *PC Paint* wasn't intended to be a full-fledged designer's tool. Mouse Systems has chosen the tools and the colors and has built an interface that holds your hand and points the way. The program might be useful for making simple illustrations for schools or clubs that could run off on a color printer. However, *PC Paint* fully realizes its potential as an introductory graphics package. It would be interesting to see if Mouse Systems will be able to incorporate a similarly well-thought-out design and effective interface in a more sophisticated graphics program. More than anything, though, *PC Paint* is an enjoyable, well-conceived toy. ■



All of *PC Paint*'s features are on its icon menu

including the patterns along the bottom border. However, while the icon borders make it easy to choose a new function, artist Gradisher said that, "working on an image when you can't see all of it will take some getting used to." You can remove the menus to increase your view of the drawing area, as in the top left illustration.

To design the computer paper in the middle picture, artist Martha Gradisher used the filled-polygon function. She used the filled-freehand function to create the red sweater. The collar is a blank area.

PC Paint's geometric shape tools eased replicating the ComputKids logo in the top photo. Gradisher created the stippled effect by expanding the image and coloring each pixel.

ABOUT THE ARTIST

Martha Gradisher studied studio art at Ohio University in Athens, Ohio, and started selling commercial art in 1979. Since then, she has worked as an illustrator for various trade publications; her art has also appeared in *Business Week*, *Parents* and *Personal Software* magazines. Her latest show, at the Possible 20 restaurant in New York City, exhibits her caricatures.



LUMENA

TIME ARTS'S LUMENA SETS A STANDARD FOR GRAPHICS PACKAGES TO FOLLOW WITH ITS EXTENSIVE ARRAY OF FEATURES.

Lumena, from Time Arts, is such a comprehensive system that it illuminates the potential for graphics on a microcomputer. At heart, this powerful hardware and software combination is an outstanding drawing program. It also offers video input and animation capabilities. *Lumena* can do just about everything for the commercial artist except come up with the concept.

Lumena requires 256K to 512K memory, a monochrome monitor and keyboard, and an analog color monitor capable of displaying 256 colors at one time at a resolution of 512 x 481. It also requires a digitizing tablet and stylus or mouse. You can purchase these items directly from Time Arts. A full-scale *Lumena* system requires so many boards that Time Arts recommends that you have the company install the cards into a separate expansion chassis, the Graphics Subsystem GS10.

A Division of Labor

Lumena has put the monochrome monitor to good use displaying all textual information, including documentation, while the color screen displays your artwork and provides access to all drawing tools.

You use the digitizing tablet to choose from the unusually designed but efficient menus appearing at the bottom of the color screen. These menus are the width of the screen and only two lines high. All the menus and submenus follow the same format, consisting of four components. The ten boxes on the left hold the name of the current menu and up to nine commands or function names, many of which have related submenus. To the right of the main function commands are six single-letter commands for utilities such as saving and loading images, pulling images from buffers, and requesting documentation to appear on the monochrome monitor. A contiguous status box uses single letters or short phrases to let you know what drawing mode and command you're using. A small square displays the current color.

The palette, on the right end of the menu, has three rows of 16 color squares each. Each square in the two bottom rows represents eight related colors, the other seven of which you can imagine as being stacked beneath the visible color. The two colors that you've most recently selected will be displayed on the top row of the palette, as will their seven related hues. You can alter the colors appearing in each stack or use the defaults. The red, green, and blue components of the current color, each represented by a number from 0 to 255, are shown at the bottom of the monochrome monitor.

This design conveys a great deal of information to the user in a small space that doesn't appreciably interfere with the drawing area.

Lumena's Tools

Lumena has many unique and unusual features. For example, *Lumena's* magnify command allows a very wide range of amplification. Instead of specifying the percentage of magnification you want, you enclose the area that you would like to enlarge in a rectangular outline. Regardless of the size of the selected space, *Lumena's* magnify command will increase it to fill

the entire screen, if so directed.

Every artist's graphics package offers a choice of pens and brushes; *Lumena's* offering is unusually varied. A stipple command creates an even spray of up to four colors. This differs from the airbrush command, which uses the stack of eight related colors to make a spray that is densest in the center.

You can obtain some unusual effects with *Lumena's* brushes. A symmetry brush will reproduce your sketch in four-way correspondence—great for kaleidoscopic effects—while a butterfly brush suggests radiance by drawing lines emitting from a hub.

Many of *Lumena's* freehand and automatic shapes commands smooth the edges by shading the fill color with the seven related hues in the stack, a process known as anti-aliasing. When done with a wide brush, this process gives a smoky effect. You can also use this function to smooth or fade the sharp edge of a color, giving a three-dimensional appearance.

Among its shapes and tools menus, *Lumena* offers a connect-the-dots command called "spline." After you start the command and place your dots on the screen, the spline command will make smooth curves in your chosen brush and color. You can tilt elements with the oblique command, giving them an italic look, and you can stretch portions of an image using a command called "shear."

Lumena offers several ways to alter and mix hues. You can vary the amount of red, green, or blue in a color by moving the

PC FACT FILE



Lumena

Time Arts Inc.
3436 Mendocino Ave.
Santa Rosa, CA 95401
(707) 576-7722

List Price: Basic \$9,995; super \$12,995;
print package \$4,925; video package \$7,293.
Requires: 256K to 512K RAM, DOS 2.0 or later, two
double-sided disk drives or one disk drive and a hard
disk, monochrome monitor, analog RGB monitor,
digitizing tablet and stylus or mouse.
Color Maximum: 16.7 million
Resolution: 512 x 481

CIRCLE 699 ON READER SERVICE CARD

mouse across the digitizing tablet in a specified direction or, if you prefer, by designating the red, green, or blue component as the one to be changed and moving the mouse horizontally on the tablet.

Lumena also features a color map, which relates a particular position in the palette to those parts of the image that have been drawn with that color. By changing the hue in that position, you can also change the color of every related part of the image. *Lumena's* commands for changing and saving color maps are thorough and straightforward.

Type Casting

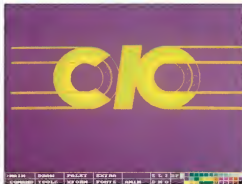
To make the creation of text as exact as possible, *Lumena* breaks down the process into its component parts. After selecting one of 12 fonts from the types menu, you can use the character-style menu to vary the size of the letters and to make them boldface, italic, or outlined. You can angle the individual letters, modulate the spacing between them, and slant the baseline of the text. If none of the typefaces suit you, you can design your own with the font design menu, save it, and use it as you would any of the prepackaged ones.

Animation

Lumena's animation program could entertain you for weeks. Its animation effects are achieved through color cycling: Multiple drawings are on a single screen, and the colors are switched on and off to give the impression of movement. The program also has many different ways of making an image materialize, such as slowly opening illusory vertical or horizontal blinds through which you view the image or spiraling the image onto the screen.

If all these features aren't enough for you, *Lumena* also has a video package. If you like, you can retroactively add color to an image that you have captured with a black-and-white video camera.

You can also prepare images to output to film. To match the resolution of high-resolution film, *Lumena* multiplies each pixel, increasing the resolution from 512x481 to 1,024x962 or even 2,048x1,924. You can then recall a portion of the new high-resolution image, expand it to fill the screen, and refine it by adding detail.



 Lumens's extended set of design tools, including the full palette, is available through the two-line main menu and the submenu appearing at the bottom of the screen. Artist Maureen Jones obtained the smooth range of hues in the tails of the letters in the CompuKids logo with the grad function, available through the form command on the main menu. She drew the outline of the CompuKids logo against a grid to position it.

The versions of the letter e demonstrate how *Lumina's* scaling commands can alter a shape. The complementary rotate commands can be used to turn the e or tilt it.

Jones specified several pen widths for drawing the CompuKids advertisement and used the fill-in command to color the portions of the brain. She chose one of 12 fonts for the text, then modified the size, spacing, and color of the letters.

MONITOR TERMINOLOGY

WHAT YOU'VE ALWAYS WANTED TO KNOW ABOUT ANALOG AND DIGITAL MONITORS BUT DIDN'T KNOW HOW TO ASK.

Discussions of computer graphics often involve enough technical jargon to confuse and intimidate anyone. This short guide will help you keep track of the essential terminology so you don't find yourself uselessly wondering, "Do I need an analog or an RGB monitor?"

Let's start at the jack you're least likely to use on your color adapter board: the "composite" output. To convey a sense of its origin and limitations, this jack, which looks like the ones on the back of a hi-fi system, could just as easily be called the NTSC (National Television Systems Committee) output.

The video signal that you recover at this type of jack after it passes through your TV set's tuning circuits is the same as the one found at your computer's composite output. The composite signal is a mixture of four components—red, green, blue, and luminance (brightness). This combination makes the composite signal compatible with both color and black-and-white reception. A color TV set (or a color composite monitor) splits off the R, G, and B components and sends them to separate red, green, and blue electron "guns," whose beams create the picture on the face of the cathode ray tube. A black-and-white TV or monochrome composite monitor splits off the luminance component, using that for its single electron gun.

Two things are important about the composite video signal. First—on the minus side—because the signal at the composite output is limited to the bandwidth of a high-grade TV set (a little over 4 MHz), it does not have a high enough resolution (sharpness) to let you distinguish 80 alphanumeric characters on a single line of the screen. Second—on the plus side—since the composite video signal is analog rather than digital, it can show subtle differences in color shading that exceed the capacity of most computer graphics equipment.

Analog and Digital

Human eyes and ears are considered analog devices because they are capable of responding to continuously varying stimuli. Within limits, we are sensitive to extremely small differences in a theoretically infinite number of colors or pitches. The "flesh tone" knob on a color TV set is an analog control because it allows us to choose a point along a continuum that ranges from seashell to sunburned.

A computer, of course, is a digital device. As the lyrics say in Rogers and Hammerstein's *Oklahoma!*, "It's all [on] or nothing [off] with me." The "all" in this case is generally a voltage greater than 2.4, while the "nothing" is less than 0.5 volts. These are the nominal TTL (transistor-transistor-logic) signal levels for a digital "1" and "0," respectively.

While an analog system can create an almost infinite variety of colors simply by gradually varying the proportions among the R, G, and B electron beams, a digital system's range of colors is determined by the number of bits devoted to specifying color information. The PC's color/graphics adapter and its normal color monitor use 4 bits: R, G, B, and I (intensity). This gives a maximum of 16 colors (ranging from 0000 for black to 1111 for intense white) that can appear at any point on the screen.

At any particular point on the screen, however, each of the colors must be completely present or completely absent: You can't add just a touch more green to change the tint in a system where green can be only on or off. On the other hand, because the separate R, G, B, and I signals at the regular output of the color adapter board are not designed to fit within the narrow (4 MHz) bandwidth of a color TV set, they can make full use of a high-resolution RGB (as opposed to composite) monitor.

Let's turn next to the question of reso-

lution. On a monitor designed to be used with the standard IBM Color/Graphics Adapter, the "sweep rate" (the number of times per second the beam scans across the tube from left to right) is 15,750 Hz. Inverting that number, each sweep takes about 63 microseconds. If we now subtract the time when the beam is off (the black left and right edges of the screen and the retrace times), you get a fairly standard 40 microseconds for the active part of each trace.

In that time, the beam must illuminate one row of dots (pixels) running across each of the 80 characters, or two characters' worth per microsecond. Each character box is 8 pixels wide. So, 16 pixels must be illuminated per microsecond, which is to say, 16 million dots (illumination events) per second. Illuminating this many does not require a full 16-MHz bandwidth; in fact, the IBM color monitor has a 14-MHz bandwidth, and by one rule of thumb, 8 or 9 MHz should suffice. Still, this bandwidth—which is far greater than you would find on a composite monitor or a television set—is the ultimate reason why you can put 80 characters on a line with an RGB monitor and only 40 with a TV set or TV-like composite monitor.

Analog circuits are not inherently limited in bandwidth to the 4 MHz of a TV-compatible composite signal. Indeed, a number of products are designed to use wideband (up to 30 MHz) analog RGB monitors. For instance, the cathode ray tubes in both digital (TTL) and analog RGB monitors are the same. It is only the differences in the monitors' amplifier circuits that make it necessary to use a TTL (digital) computer output with a TTL RGB monitor and an analog board with an analog RGB monitor.

These differences will eventually be made to matter less. Analog devices are now being designed for wideband high resolution rather than just TV emulation. As their capabilities increase, it is likely that monitor manufacturers will build in the necessary switches and additional amplifiers so that the same RGB monitor can be used in either analog or digital mode.—Craig L. Stark

Artist Maureen Jones (see "About the Artist") tested a number of *Lumena's* features by using them to create and manipulate the letter A. One feature, the fonts program, is an optional package, but once you install it, you can apply any of *Lumena's* functions to the letters you place on the screen. Jones began with a large A, lilac-tinted and outlined in yellow. With the aid of the rescaling features, Jones created some odd-looking variations. She shortened the A by rescaling the y-axis in relation to the x-axis. She stretched the A into a tall, curved, Eiffel-tower shape with the "taper" command. To make the A look massive and looming, Jones used the "perspective" command. A squat, rounded A was produced by aborting the perspective command after it had altered the y-axis, but before it had begun changing the x-axis.

After transforming the shape of the letter, Jones layered two A's of different colors on the screen by bringing the second A to the screen from a frame buffer. This feature, in which you can specify under- or overlaying, is extremely useful for building up an image.

You can keep picture elements close at hand in the cell buffer, which is *Lumena's* graphic scratch pad. The cell buffer is handy for experimenting with or manipulating a picture element without endangering your image. When you've completed the element to your satisfaction, you can place it intact in your image.

As Jones created each version of the A, she saved it. Later, when she wanted to retrieve one, she used the "look" command to make up to nine shrunken images appear simultaneously. Then she could choose the one she wanted by sight, rather than having to remember its name.

The Logo

Experimenting with the alphabet prepared Jones to design the CompuKids logo. Since none of the fonts gave her the lettering she needed, she created her own. To ensure that the lettering was even, she laid out a grid with the grid function. Then, with the aid of the circle command, she drew two sets of three concentric circles to form the C and the body of the K. After she completed the rest of the outline, she tinted the letters with the fill-in command and

shaded the four fins of the logo with the "grad" function. To use this function, she chose several colors from the palette, then placed a window over a fin. When she locked the window into place, the area filled with a smooth gradation of tones.

For picking a point on a range, *Lumena* uses mouse movements instead of menu choices. For instance, to change brush width you simply move the mouse to the right along the digitizing pad to widen the

Lumena is so jam-packed with features that even a proficient graphics user will take a while to learn them all.

brush and to the left to narrow it. You can also vary the width and height of letters, grid boxes, or any picture element in a similar manner.

More Guidance, Please

Lumena is so jam-packed with capabilities that even a proficient computer graphics user will take a while to learn them all. The preliminary version of the manual made available to *PC Magazine* took the first vital step of describing each command thoroughly. However, Jones felt that the manual also needed to explain how to integrate the commands to create special effects. She also noted that a number of the terms that the manual uses aren't in most artists' vocabularies.

Another way in which *Lumena* could give more guidance is by putting caution messages on the color screen whenever you are a button-press away from doing something irrevocable. At one point, after Jones loaded an image she had created earlier, she cleared the screen, then accidentally pressed the mouse button while the cursor was over the save command. The next thing she knew, the empty screen had been saved into the image's file and her image was gone forever. This would have been a perfect place for *Lumena* to flash a

message asking, "Are you sure?"

It's not surprising that a program of *Lumena's* complexity is large; what is surprising is that each image hogs 262K. This means that the hard disk can contain only 16 images at a time and that only one image can be stored per floppy disk. An even more serious consideration is that 262K per image is a prohibitive amount of data to transmit electronically. Time Arts should consider implementing some sort of data compression to reduce each image to a more manageable 100K.

The Standard

Perhaps because *Lumena* expands the possibilities of microcomputer graphics software so much, Jones found herself thinking up additional features she would like to see in *Lumena*. One was that *Lumena* would make available the numerical data that you specify when you create an image. This way, it wouldn't be necessary to "eyeball" an image in order to recreate some aspect of it. For instance, when Jones chose a font, she also set the dimensions of the letters and the distance between them. When she created the CompuKids logo, she used certain brush widths and colors. If she could call up these specifications on the monochrome monitor, she could readily duplicate them in a new image. She also felt it might be nice if *Lumena* could keep a history of the steps taken in creating an image so that, for example, she could remember how she made each of the A's without having to take notes. But even without these added features, *Lumena's* high quality and myriad of capabilities set a standard that producers of similar packages will have to live up to in the future. ■

ABOUT THE ARTIST

Maureen Jones, a medical illustrator, has a M.A. in communication arts with a specialty in computer graphics from the New York Institute of Technology. She designs multimedia presentations, which have appeared at such institutions as the Metropolitan Museum of Art and the State Library in Connecticut. She is currently coauthoring and illustrating a book on LOGO.



IMIGIT PLUS

IMIGIT AUTOMATES MUCH OF THE WORK NECESSARY FOR COMBINING VIDEO IMAGES AND COMPUTER GRAPHICS.

While most computer graphics systems attempt to duplicate the artist's canvas, *Imigit Plus* strives to enhance the photographer's camera. This program, from Chorus Data Systems, displays video images captured by a video camera on your computer screen, and then you use the program's graphics tools to edit, manipulate, and combine these video images. You can also use it to create new art.

Chorus Data designed the *Imigit Plus* graphics package to run with its PC-EYE Video Capture System video interface board and an RS-170 or RS-330 compatible video camera. The program supports a number of monitors and graphics cards, all of which are listed in the documentation.

Imigit Plus makes up to 256 colors available, and the maximum resolution is 512x512. The program's capabilities vary according to the graphics adapter you use; the manual clearly diagrams these differences. *Imigit Plus* works with almost any kind of pointing device, including a mouse, a digitizing pad, a joystick, and so forth.

To Catch a Video

Once you install the PC-EYE Video Capture System board and the *Imigit Plus* software and train your video camera on something, all you have to do to capture an image is place the cursor on the main menu's camera icon and press a mouse button.

You can change the tones of an image as you capture it in two ways. One is to modulate the white and black levels, which set the limits above and below the incoming signals, or light waves, that are digitized as pure black or pure white. When you change these levels, you radically alter the colors of the incoming image.

The ColorVertor potentiometer, an optional box with four analog slides for adjusting tint, color, brightness, and contrast, also lets you change the tones of an

incoming image. This method gives you greater control.

Imigit Plus can also incorporate graphics from other systems. Currently, it can capture images in IBM format or in Tecmar's 320x200 four-color mode, through the use of a separate program on the *Imigit Plus* disk.

The slide show program also obliges you to leave the *Imigit Plus* graphics program. The Show program uses a series of menus and input forms to guide you through the process of setting up a sequence of images for presentations.

Iconographic Effects

Chorus Data efficiently arrayed the *Imigit Plus* icon-based menus along the borders of the screen. For example, a small box in the lower-left corner always displays the current drawing mode, drawing or outline color, and fill color or hatch pattern.

The drawing-mode icons are located in the upper-left border of the screen. This menu also includes icons for storing, retrieving, and capturing images, and so it is essentially the main menu. Other permanent icons that reside at the bottom left border permit you to select the width and style

(continuous or broken) of your drawing line. The representations of the different types of hatches or patterns as well as the palette are also displayed in the bottom left border.

Each of the color squares or icons of the palette have two parts that you use in conjunction with the left and right mouse buttons to produce different effects. For instance, when you press the left button over the upper half of a color icon, you change the drawing color, but when you press the left button over the lower half of a color icon, you alter the filling color.

The paintbrush icon determines if a pattern or shape put down by a drawing tool is continuous or discrete. For example, if you are using the circle icon and want to paint a row of circles that resemble a slinky toy, you activate the paintbrush icon and hold down the left mouse button. If you now want to place single, discrete circles on the screen, you simply turn off the paintbrush icon. (You can define anything you put on the screen as a brush; you can also design your own hatch pattern.)

The line menu presents two rather unique features, one of which replaces the straight lines connecting the points of a polygon with a continuous curve. A "rubber band curve-fitting" function lets you use your pointing device to pull a polygon around on the screen. This process distorts the polygon's shape, making it look like an amoeba moving about in a heavy gravitational field.

Eight fonts are also available, including a Greek alphabet with a small, unvarying



Imigit Plus

Chorus Data Systems, Inc.

P.O. Box 370

6 Continental Blvd.

Merrimack, NH 03054

(603)424-2900; (800)624-6787

List Price: *Imigit*, \$295; *Imigit Plus*, \$695

Requires: 256K RAM, two double-sided disk drives or one disk drive and a hard disk; one of eight graphics boards, monitor suitable to graphics board, and the Chorus Data PC-EYE Video Capture System and camera.

Maximum Colors: *Imigit*, 16; *Imigit Plus*, 256

Resolution: *Imigit*, 640x400; *Imigit Plus*, 512x512

CIRCLE 668 ON READER SERVICE CARD

text font. You can make the other fonts vary to any size.

A One-Way Avenue

Unlike many color graphics systems, *Imigit Plus* does not use color maps, which relate locations on the image to positions in a palette. Instead, Chorus Data makes a full palette of 256 colors, which it presents in sets of 8 that are available at all times. Pointing the cursor at the color change box, you press a mouse button to cycle through the palette. This setup is convenient because you do not have to leave the drawing mode to pick a color, but it also has some drawbacks.

Mark Falls, the artist who tested *Imigit Plus*, says he likes the *Imigit Plus* palette because he is used to seeing his paints arrayed in front of him. But because you can cycle through the palette in only one direction, the process becomes time consuming, especially if you bypass the color you want. In practice, you must often cycle through the palette twice: first to find the color you are currently using and then to select your new color. Falls thinks Chorus Data should number the colors. "If you can't distinguish the color you are working with from other colors on the palette, you can't really be sure of accurately choosing the same one again. If it had numbers, you would know for sure."

Imigit Plus also has an unusual function for creating a screen in which all the colors are converted to their opposite values (such as in a photographic color negative). This function is also available within the cut-and-paste and rubber-stamp menus, so that you can make a negative of any area or picture element.

Building Up Images

The *Imigit Plus* software incorporates an easy-to-use technique for overlaying and intersecting images: It assigns certain ways of saving an image to either the main menu, the cut-and-paste, or the fat-bit icon. Pictures that you save and retrieve using the main menu icon will obliterate anything already on the screen, so these are best to use as background images.

Falls used these storing and overlaying features to create illustrations on related themes. He painted full-screen subway graffiti designs on black backgrounds and



To create the stippling in the fins of the

CompuKids logo in *Imigit Plus*, artist Mark Falls filled squares of a large grid with various colors, then shrunk the grid to fit inside the parallel lines.

Falls designed the three main elements of his CompuKids image on different screens, then combined them, using geometric shapes and filled polygons to make nearly all the elements.

Imigit Plus uses iconographic menus and submenus. The palette at the bottom of the screen makes background and foreground colors available at the same time.

Imigit Plus's drawing tools enhance its video capture capability. You can use them to touch up an image as airbrushing is used to retouch photographs, or you can combine video and graphic elements to create a new image, as the large illustration shows.



STOP SOFTWARE PIRACY . . .

... with one of our new, sophisticated copy prevention programs.

for Disk Security

- PADLOCK II*
- COUPON*
- PC PADLOCK

*Preformatted & Protected Disks

for Data Security

- DATA PADLOCK
- PC CRYPT

for Telecommunication Security

- PRIVATE TALK

Why should your valuable data or useful software program become available in the Public Domain?



Call or write for more information.

GLENCO ENGINEERING INC.

3920 Ridge / Arlington Hts. IL 60004
(312) 392-2492

COVER STORY

stored them using the cut-and-paste menu. Later, he retrieved them with the same menu, specifying the matte feature so that the nonblack portion of the images would layer onto the screen in the order in which he selected them.

Falls originally used the cut-and-paste submenu to create and store separately

Chorus Data's Imigit

Plus makes a full

palette of 256 colors,

which it presents in

sets of 8 that are

available

at all times.

both the person at the computer console and the bust that are combined in his CompuKids advertisement. But when he retrieved the figure at the computer console, it appeared, immovable and unusable, in the upper-left corner of the screen, underlying the drawing-mode icons. A Chorus Data spokesperson explained that this happened because Falls had saved the picture element with the small-image disk storage icon but had retrieved it with the full-screen retrieval icon. It's important to use equivalent saving and fetching icons.

Fat-Bit Editing

With the fat-bit editing menu, you can save and retrieve smaller sections of an image than you can with the cut-and-paste menu. The fat-bit feature magnifies a portion of the screen, but it would be even more useful if there were several degrees of magnification; the expanded pixels of the one size are still too small to work with comfortably.

Falls experimented with the fat-bit mode to create the multicolored tails of the CompuKids logo letters. He found this method to be exact, but slow. He also tried out the grid function for this purpose. Using the largest-size grid, he filled in the squares with different shades of orange and red. Then he used the rubber-band

rectangle to capture a portion of the colored-in grid and shrink it down to fit the letter tails. In effect, he used the grid as "fat bits in reverse."

According to Falls, one of *Imigit Plus's* ongoing annoyances is that the cursor has a tendency to disappear when moving between the main and submenus. When it disappeared, he had to go back to the main menu and request the pop-up menu again. A company spokesperson said Falls was probably moving the mouse out of the drawing area in the same second it takes for the cursor to reappear.

To make the bust, Falls wanted to combine geometric shapes rather than draw it freehand. However, he soon found that he could change the orientation of the shapes only on 90-degree angles, which are too limiting. "I really wish *Imigit Plus* could do rotations other than 90-degree angles," he says. "The great thing about being able to rotate elements is that you could make a series of body parts and then put them together at different angles." He worked around this limitation by using either geometric shapes or filled polygons and then slicing away sections of them to shape them. His two-dimensional sculpting seemed very appropriate for depicting a three-dimensional stone sculpture.

All the Right Moves

Imigit Plus offers several means for controlling a video image, so you can exactly duplicate an image or alter it in any number of ways without having to develop the film or do much of the mechanical work necessary for combining video images and artwork. Overall, *Imigit Plus* is a versatile system that will please both photographers and graphic designers. ■

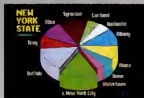
ABOUT THE ARTIST

Mark Falls, a free-lance designer for record companies, book publishers, and magazines, graduated from Florida State University in 1978 with a B.A. in graphic design. He worked for 3 years as a graphic designer in Atlanta before coming to New York in 1981. In 1983, his art appeared in a show entitled "The New Illustration" at the Society of Illustrators.



INTERNATIONAL SALES
For least divisions

Country	Pop(mil.)	Units Sold
Japan	110	20.1 K
China	600	10.2 K
Australia	15	0.2 K
Taiwan	13	2.1 K
Hong Kong	3	1.3 K
New Zealand	2	0.5 K
Singapore	2	0.1 K



The Grafix Partner Enhances Any Graphic Created...

The Graphics Enhancement Utility That Sits In Background.

It's always there, ready to pop-up behind 1-2-3 or any spreadsheet with graphics or any other graphics program. Use the Grafix Partner to finish and refine any graphic or text screen. No matter what graphics software you are using, you need the Grafix Partner utility in background to give you the capabilities your present software does not have.

Use **Zoom**, **Undo**, make a slide show with **Cycle**, change colors, use **Patterns**, **Paint**, **Repaint**, **Draw**, add **Text** using any of 20 **Fonts** provided, add logos, **Transfer** art and logos, **Erase**, cut and paste, highlight, airbrush, rubberstamp, **Copy**, **Block** transfer, **Upend**, **Mirror**, **Swap** colors, and more.

The **GRAFIX PARTNER** is a graphics utility that uses all of the power of your graphics hardware and software, and adds its capabilities to both. The Grafix Partner works with **Polaroid Palette** and will drive popular plotters and printers.

The **GRAFIX PARTNER** is available for 16 color and higher resolution boards with up to 136 colors. **Wang** and **DEC** versions are also available.

The Grafix Partner \$149.

To order, mail form below today, or
CALL 315/474-3400

Name

Address

City State Zip

Card No.

☐ VISA ☐ Exp. Date

☐ MasterCard ☐ Signature

Type of Graphics Board

**Brightbill-Roberts
and Company, Ltd.**

120 E. Washington St.,
Suite 421
Syracuse, NY 13202
315-474-3400

Lotus and 1-2-3 are trademarks of Lotus Development Corporation. Polaroid Palette is a trademark of the Polaroid Corporation. DEC is a trademark of Digital Equipment Corporation. Wang is a trademark of Wang Laboratories. Grafix Partner is a trademark of Brightbill-Roberts and Company, Ltd.



ARTWORK & BRUSHWORK

ARTWORK AND BRUSHWORK, THE CORE OF WEST END FILM'S ARTWORK ENVIRONMENT, OFFER THE BENEFITS OF BOTH VECTOR- AND RASTER-BASED TECHNOLOGY.

The strengths of different graphic design packages tend to fall into three distinct categories: freehand drawing, video input, and three-dimensional shape construction. All three of these strengths, which to some extent depend on different hardware and software technologies, are extremely difficult to incorporate into one integrated package. In an attempt to do the near-impossible, West End Film, Inc. has created the Artwork Environment. This group of programs can handle video input, drawing, color shading, three-dimensional shape manipulation, animation, and illustration output in a variety of formats.

To achieve this combination, West End Film offers two complementary graphics packages that utilize two mutually exclusive graphics technologies—vector and raster. (Vector-based systems emphasize three-dimensional shape manipulation and efficient utilization of space, while the forte of raster-based software is freehand drawing.) At the core of the Artwork Environment system is the *Artwork* program, a vector-based software product. Other programs in the series work in tandem with *Artwork*, including the raster-based *Brushwork*, a program you would use for drawing, designing brushes, and shading flat objects. Other enhancement programs include *Charwork*, a charting program that operates with *Artwork*, and *Font Librarian*, which operates with *Artwork*, *Brushwork*, and *Charwork*. The Artwork Control Language lets you use the images from *Artwork* and *Brushwork* to create slide shows and animation. *VideoWork* is a motion-scripting or animation package and *Pagework* facilitates page layout. These programs form a complete, powerful graphics environment when used together to manipulate images created with the *Artwork* and *Brushwork* core programs.

Vector and Raster

Artwork and *Brushwork* each embody different graphics technologies. A vector-

based system like *Artwork* does not store your image as you see it on-screen. Instead, vector systems maintain a set of point-to-point instructions on how to recreate the various components of your image. The raster method duplicates the screen image in memory pixel by pixel, storing information on each pixel's color and location in your image.

Respective Advantages

Each means of image storage has distinct advantages. An image recorded by the vector method occupies an appreciably smaller amount of storage space than the same image stored with raster technology. A set of vector instructions can be used as input to a high-resolution camera, which is independent of the resolution of the monitor. Vector systems also manipulate 3-D objects, and West End Film has made this ability the backbone of the *Artwork* program.

Since raster systems record the color and position of each individual pixel, they lend themselves to freehand drawing as well as to editing images. When used together, these two formats would seem to offer every design tool possible on a microcomputer.

However, while it is relatively easy to convert vector information into raster format, it is virtually impossible to do the re-

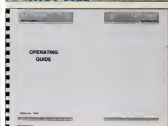
verse. This limitation means you can convert your *Artwork* program images for use in *Brushwork*, but you won't be able to apply the *Artwork* tools, such as the 3-D features, to the raster version of your image. Going the other way, you can make a *Brushwork* image appear on-screen while you are in the *Artwork* program, and you can layer *Artwork* images on top of it, but you will not be able to alter the *Brushwork* portion of the image.

System Requirements

Artwork and *Brushwork* have very flexible system requirements. They can use one of several graphics cards. For this review *PC Magazine* used the Revolution Number 9 card, which allows you to implement some additional features in *Artwork*. The JRAM II card, manufactured by Tall Tree Systems, is an optional but worthwhile addition to a set up using a Number 9 Card; it lets you smooth the jagged edges of curved images with a process known as anti-aliasing. Since pixels are squares, curved shapes, such as circles, will tend to look jagged; anti-aliasing shades the perimeters of shapes with lines of related hues, making the shapes look as if they are standing in front of the background.

Your IBM PC, XT, AT, or compatible must be equipped with 512K of memory to

PC MAGAZINE



Artwork and Brushwork

West End Film, Inc.
2121 Newport Pl., N.W.
Washington, D.C. 20037
(202) 331-8078

List Price: *Artwork*, \$2,450;
Brushwork, \$1,450.

Requires: 512K RAM, Tall Tree's
JRAM II card suggested, DOS 2.0.
Color Maximum: 256 colors
Resolution: 512 × 480

CIRCLE 667 ON READER SERVICE CARD

use the programs. It is easy to inform either software package of the peripherals connected to it by using the Artwork Environment's menu-driven installation program. You indicate which mouse or digitizing pen and pad you are using with the program and the name of the plotter or ink-jet printer you are installing.

Format of Artwork

Artwork's screen interface consists of four narrow, informative borders. The left border is a column of three-letter commands that represent menus and their submenus. Placing the cursor on one of the commands activates a function.

As you work with a function, guiding comments appear on the prompt line in the top border. Artwork's commands generally do not trigger just a single action but set off a multistep procedure. A prompt appears at each step of the process, explaining what action, such as choosing a color or picking a subcommand, you must take next. For the most part, this feature works very well, although the top-border prompts are less informative than they should be in the complex Modify menu, the section of the program for manipulating shapes.

A palette of 16 colors appears along the bottom border. If you select a color with the cursor, then press S on the keyboard, these color squares will be replaced with 16 progressively darker shades of the color you chose. You can then select any of these hues to work with.

Artwork's folio area, along the right border, lets you preserve an image in memory. You can place each individual image element you've created into a separate folio, ensuring that any mistakes you make won't mess up the entire image. When you want to see the completed picture, you can select some or all of the related folios and they will layer them onto the screen. Judith Miller (see "About the Artist"), the artist testing Artwork for PC Magazine, said that she had created an image using several folios but had then decided that she wasn't satisfied with one element. "I can modify the red triangle since it's in a separate folio, then put the entire package together without having to redo the whole thing," she said. You can store the folios to disk individually, or you can



The screen formats for Artwork and Brushwork

array the menus and submenus along the left border and use the top margin to give you directions for each step. You can replace the palette with graduated hues of a single color. Artwork uses the folios on the right edge for referencing images. You can assign each element of an image to a folio, then mix and match them.

Artist Judith Miller designed the CompuKids logo entirely in Artwork. She used the electronic T-square to ensure that the four fins of the logo would be perfectly horizontal, and she used the grid feature for making the small squares of color.

Artwork boasts impressive functions for creating and manipulating 3-D images. The extrusion function gave depth to the text of "Cranium." Rotating the text on the x and y axes caused it to lift back and to twist slightly.

A PLEASING PALETTE

THE DISCORTX RGB+ COLORING SYSTEM WORKS EASILY WITH YOUR PC AND LETS YOU CHOOSE FROM OVER 250,000 COLORS.

Medium-resolution graphics systems, such as *PC Paint* and *Videogram*, offer limited color capabilities, but a new plug-in board on the market allows them to compete with the big guys. The Discortex RGB+ Coloring System takes all of the IBM-compatible systems and enhances them tenfold for under \$400.

The RGB+ system allows you to access a palette of 262,144 colors without having to exit from your paint or drawing program. In other words, you don't have to change software in order to alter the colors in your program. By converting the digital RGB signal to an analog RGB signal, the Discortex plug-in board releases you from the slavery of your system's 4 to 16 colors. Here's how it works: A digital RGB signal is a fixed signal that sends on and off commands to the monitor. The digital control card in your computer can produce up to 16 colors by sending specific instructions to each pixel (picture element) it is illuminating. The Discortex board takes this digital set of instructions and converts it to an analog set of instructions. By doing so, the Discortex software can manipulate the color instructions and alter the display colors that your computer will

now send to an analog RGB monitor as opposed to your TTL (transistor to transistor logic) monitor.

In addition to the Discortex adapter board and software, you will need an an-

**The RGB+ system
allows you to access a
palette of 262,144 colors
without having to exit
from your paint or
drawing program.**

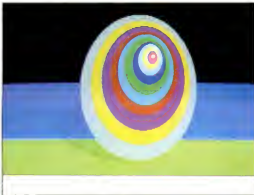
alog RGB monitor in order to use the RGB+ system. If you look around, you will find that you can currently purchase one of these monitors at a relatively low cost. Sony manufactures a line of monitors that can handle both signal types, analog and digital. Its model CPD 9000 is a 9-inch, analog/digital color monitor with .25 pitch for fine clarity. This monitor

has a resolution of up to 640 × 240 pixels and costs under \$600.

Ready, Set, Go

The RGB+ system is simple to install. You just plug the board into an available short slot in your PC, XT, or AT. The system comes complete with the cable necessary to carry the TTL signal from your color graphics card to the CX-1 Color Transformer card. Using a nine pin connector, you plug in an analog RGB monitor to R,G,B, Sync BNC cables and then install the Discortex software. You are now ready to go. RGB+ software operates independently of any other software, so you may call it up out of the background while you are creating an image with any program that you choose, providing you first load the RGB+ software. To turn off your applications program and turn on the RGB+ program, you simultaneously strike both Shift keys. You can alter any of the colors in your image, set up a new palette, save a palette, or retrieve a previously saved palette, and then return to your working program by simply striking Ctrl-End. The program has no on-screen menus, which, to some users may be a drawback, but the set of keyboard commands is easy to remember.

To alter a color, you first strike Alt-B to activate the color blink function, which will tell you which color is currently in use. If that color is not the color



you want, then you use the left and right cursor keys to move forward or backward through the palette until you find the desired color. You use the function keys to alter the chosen color: F1 and F2 control red intensity; F3 and F4, green; and F5 and F6, blue. The first (or left side) function key in each set decreases color intensity. The second (or right side function) key increases intensity. You may also hold down both keys to scroll, in increments of one, through a color's intensity range, which is based on a scale of 0 to 63. If you want to jump to full or 0 intensity, you hit Ctrl-Function key to jump to either the brightest or darkest in any of the three colors. Or you can go to the midpoint of red, green, or blue by hitting Shift-Function.

Quick-Change Artist

These quick-adjust functions came in handy when we created the image in the photograph on the far left. We drew the sphere in the basic eight colors used in *DR. HALO*, but the colors appeared gar-



RGB+ Coloring System

Discortex Corp.
87 Bethpage Rd.
Hicksville, NY 11801
(516) 935-5538
List Price: \$395

Requires: Analog RGB monitor, color/graphics board.

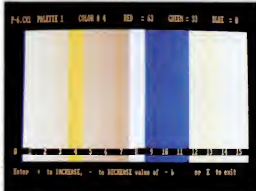
CIRCLE 864 ON READER SERVICE CARD

ish in the shades provided by the digital system. Through the analog conversion and manipulation with the RGB+ software, however, we made the image look natural in shading and form.

With the RGB+ software, you can quickly address four different palettes by using the F7 through F10 keys. The system can read and write up to ten palettes in total. To save a palette in a file, you hit Alt-S followed by a single digit (0-9), which represents one of the ten available palettes. You access a stored palette by first striking Alt-L and then a single digit.

The RGB+ system comes with a set of utilities to help you refine your color transformations. Once outside your program, you may access the RGB+ utility program. These utilities offer a more finite way of selecting or defining palettes. Red, green, and blue are each broken down into an incremental value between 0 and 63. You may call any color in a given palette to the screen displayed in its numerical value and then alter it by using the plus (+) and minus (-) keys to change its numerical value. The utilities prove most useful for fine-tuning colors or maintaining color consistency in any palette.

All in all, if you are getting tired of how your computer limits your color choices, you can put yourself back in the driver's seat with the Discortex RGB+ Coloring System.—Heather Luchak and Gerard Kunkel



DR. HALO and its 16-color palette was used to draw the sphere in the image at far left. Using the RGB+ system, the palette was altered to make the sphere appear more realistic (center). Left: The RGB+ utility software gives you a display of your palette's 16 colors. You may select one of them and change its red, green, or blue intensity.

combine all of them into one file.

In addition to the on-screen menus, *Artwork* makes use of the keyboard. Any modifications you make using the cursor, such as altering the shape, palette, or angle of rotation, are usually accompanied by numbers appearing in the upper left-hand corner of the screen. You can then use the

**With Artwork, you can
place each image
element into a separate
folio, so that any
mistakes you've made
won't mess up the entire
image.**

keyboard to set the numbers—and the modification—exactly.

Using Artwork

Artwork has three main command menus for creating images: Draw, Edit, and Modify. The Draw menu lists functions for drawing simple geometric shapes, such as straight lines, circles, polygons, and grids. You can fill an area with color or airbrush a color onto the screen. You can add text in a variety of fonts, varying the size, spacing, and design of the letters.

Miller commented that in the Draw and Edit menus "everything works beautifully and easily." While these menus are good first courses, the real meat of *Artwork* is the Modify menu. It will enable you to turn flat objects into multidimensional ones, stretch them, push them into the distance, and turn and tilt them in a variety of angles. You would usually use the Modify commands in combination to obtain a particular effect. Suppose, for example, you wanted to make a perspective drawing of a box. You would start by using the box functions of the Draw menu to create a flat rectangle on-screen. Next, you would indicate the depth of the box with the extrusion function of the Modify menu. The three-dimensional box would be drawn,

but it would still look flat. To set the angle from which you would view it, you would rotate the box around the x , y , or z axis. Other commands can convert solid shapes into wire frames and vice versa. You can specify the position of a light source and shade a solid accordingly.

The two most impressive functions in the Modify menu are rotation and multi-axis rotation. The rotation function turns a flat shape into a multidimensional object with as many sides as you specify. Choosing four sides would be another way to create the box described above. The rotation function also asks you to choose a center of rotation.

The multi-axis rotation function goes a step further by creating a solid that moves through space. With it, you can, for example, create a Superman logo that seems to zoom forward.

Using Brushwork

By contrast, all aspects of the raster-based *Brushwork* program can be learned quickly. This program is similar in focus to many of the paint programs currently on the market. Using a menu format much like *Artwork*'s, *Brushwork* includes functions for creating many geometric shapes, such as circles, polygons, and grids. Unlike *Artwork*, the program has a freehand drawing feature in which you can vary the line width and color. It offers its own set of fonts.

Brushwork's color menu offers shading of flat figures, something *Artwork* can't do, and has commands for replacing all occurrences of a particular color.

The brush create and brush draw functions help you create custom brushes. This is a nice feature, because it is easier to select a portion of an image and modify it to use as a brush rather than design one from scratch.

What's surprising about *Brushwork*, however, is what it doesn't have. While it has a rubber stamp command, there's no cut-and-paste function, so there's no easy way to move elements around on-screen. The program has no means of rotating flat shapes or of making mirror images of shapes. *Brushwork* needs a command to alter the size of picture elements. It also needs something similar to the folio mechanism of *Artwork*, so that picture elements

can be held in a memory buffer and combined later. As it is, there is no way to combine *Brushwork* images; it's a very basic program.

Since some of these features are available in *Artwork*, this is not as great a limitation as it might seem. Perhaps the idea is that you should use *Artwork* for some ma-

With Artwork's multi-axis rotation function you can create a solid that moves through space. You can, for example, create a Superman logo that seems to zoom forward.

nipulations and *Brushwork* for others. But the differences between vector and raster methods, exacerbated by the limitations of the *Brushwork* features, make this dual use difficult.

Brushwork does, however, accept images captured with Chorus Data's PC-EYE video card. You can output completed illustrations through the *Artwork* program to an analog film recorder or to a plotter or printer.

Using Them Together

In spite of the technological limitations, Miller did manage to use the two programs together. In creating her CompuKids advertisement, she found that she had to plan the order of steps carefully, keeping in mind which program she would need to use for each component of the illustration. She found that if *Brushwork* had had some additional features she would have designed the illustration in a somewhat different manner. She created the product and company names and the numbers 5 and 2 with *Artwork*, since it had functions for doing three-dimensional smooth-shading and flat-shading. She then used *Brushwork* to

draw the head and shade the background, since drawing and graduated coloring of two-dimensional objects are not available in *Artwork*. She also created the dollar and percent signs, placing them on the head. On returning to *Artwork*, she called up the *Brushwork* drawing of the head as the background so that she could size and position the text and the numbers that she had previously created in *Artwork*. If she had wanted to create new numbers or text at this point, her *Brushwork* background would have disappeared, and she would have had to call it up again. After a couple more moves back and forth, she called up the *Brushwork* background in *Artwork* and displayed the *Artwork* folios of the various details on top of it. After saving this collage in raster format, she had completed her illustration.

The Manual

The *Artwork* Environment manual is not nearly as sophisticated as the software. Each page of the manual contains two letter-size page images that have been set side-by-side to create a book whose shape is short and wide. Though most of the pages have chapter and page numbers, some chapters are skipped, and, because the manual contains sets of documentation for several programs, the chapter numbers don't run in consecutive order. It does not have a table of contents, an index, or section tabs. There are update pages at the front of the manual, but since the manual is not a ringbinder, the updates can't be incorporated.

The function descriptions vary in thoroughness. In most cases, an entry explains how the function works, makes some suggestions for its use, and indicates which other commands are pertinent. Most entries are accompanied by sketches of the screen menus to indicate the steps to follow for carrying out a function. Unfortunately, in the section on the Modify menu, which is the most complex part of the *Artwork* program, the function descriptions become progressively shorter and the sketches are incomplete; the section looks like it wasn't finished when the presses started to roll. When West End Film does get around to completing the documentation on the Modify menu, it would help users more if, instead of sketching in the se-

ries of screen menus, it illustrated how to modify an initial shape using different functions.

Conclusion

The Artwork Environment has been heralded as one of the best graphics systems in its class. West End Film's powerful software has brought capabilities to the microcomputer that until recently were only available on minicomputers and mainframes. The Artwork component of the system is a sophisticated tool for designing presentations, animations, and graphic designs, especially those which require a three-dimensional, geometric look. The freehand drawing and painting tools of *Brushwork* need to be strengthened so that painterly effects will also be an option. (The review of Cubicomp's *CS-5 Solid Modeling System* in *PC Magazine*, Volume 3 Number 13, describes a program with similar aims.)

However, the artist who has had experience with graphics systems on minicomputers will be familiar with the concepts underlying the Artwork Environment. A user new to this kind of software, though, will have to make a substantial commitment of time and effort to learn the system's capabilities. By providing more guidance on the screen, by telephone, and especially in the manual, West End Films could help make the Artwork Environment's learning curve less of a Mt. Everest and ensure that the user will be able to make full use of the programs' powerful tools.

ABOUT THE ARTIST

Judith Miller received an M.F.A. from the Otis Art Institute in Los Angeles in 1969. She went on to design and write visual teaching programs for preschool deaf children at the John Tracy Clinic in Los Angeles. Judith later worked as a free-lance production artist and designer for several years. She now concentrates on painting and photography. Her art is in the permanent collection of the Whitney Museum in New York and has been shown at the Los Angeles County Museum of Art and the San Francisco Art Institute.



VIDEOGRAM

WORKING WITH IBM'S EGA, VIDEOGRAM GIVES YOU READABLE TEXT AND SIMPLE AND EFFECTIVE GRAPHICS.

Not so long ago, if you owned an IBM PC, you faced a choice: You could have either clear, readable text—or color. To be able to read what you were writing, you were better off with a monochrome monitor. But if you wanted to do your word processing in rainbow hues, you had to sacrifice high-resolution text and strain your vision. IBM's new Enhanced Graphics Adapter has changed all this—but while it relegates such sacrifices to the past, it needs the right software to bring out its best.

Softel's *Videogram* software exploits the new IBM graphics board to the fullest of its potential. The EGA's 16 on-screen colors and near-monochrome 640×200 resolution are in themselves a great improvement over the 4 on-screen colors and 320×200 resolution that the standard Color Graphics Adapter offers. To this increase, *Videogram* adds 42 fonts, of which even the smallest is readable. Like the EGA, *Videogram* is a midrange tool—appropriate for in-house designs and presentations, and for anyone who likes to draw.

Tech Specs

Videogram requires that the EGA be fully loaded with 256K, rather than with the standard 64K. In addition, your PC, XT, or AT must have 512K RAM and use DOS 3.0.

While *Videogram* was designed to run with IBM's Enhanced Color Display monitor, it will also run with the Princeton Graphics System HX-9E color monitor or any other display that emulates IBM's new monitor. Similarly, *Videogram* can use several digitizing pads: *PC Magazine* linked it to the 8- by 10-inch CalComp Model 2100 for this review. Although *Videogram* is not currently capable of image capture, Softel plans to write an interface that will allow an XT to use the PC-EYE image capture board.

What It's Got

Videogram's interface displays a six-word command line across the top of the screen that remains in place at all times. Its six commands include HELP for obtaining assistance and CONFIRM for completing an action. UNDO cancels the last change, REPEAT iterates the previous action, and COLORS accesses the color selection palette. MENU fetches an icon menu and displays it along the right border.

The icons that MENU displays consist of Input, which calls an image from storage, Output, which sends an image to storage or printer, Tools for erasing and filling, creating brushes, and choosing shapes, Screen Operations to manipulate the image—cutting and pasting, recoloring the image, superimposing portions of

PC PLUS FILE



Videogram Version 3.0 Softel Inc.

34½ St. Mark's Place
New York, NY 10003
(212) 677-6599

List Price: \$200 with 64 colors and 640 × 350 resolution
Requires: 512K RAM, DOS 3.0, IBM EGA with 256K, IBM ECD digitizing tablet and light pen.
Color Maximum: 64
Resolution: 640 × 350.

CIRCLE 665 ON READER SERVICE CARD

MOUNTAIN'S VIEW OF STORAGE



Now you can satisfy all of your storage needs with one trip to Mountain. Upgrade your IBM®, AT&T®, COMPAQ® and compatibles with Mountain's field-proven FileSafe™ disk, tape, and combo systems. All provide 100% compatibility with DOS 2.0, 2.1, 3.0, PC IX, UNIX™ and XENIX™. And all come network-ready to support the 3COM Ether Series, Novell, Orchid PCnet®, NESTAR and STARLAN.™

THE HIGHER ROAD TO HARD DISK STORAGE.

For additional hard disk storage, choose from Mountain's high-

performance internal and external FileSafe disks, featuring capacities of 10, 20, 30, 35, 68 and 120 megabytes.*

CLIMB-UP TO WORRY-FREE TAPE BACKUP.

If super-reliable tape backup is what you're looking for, our 27 and 60 megabyte internal, external or Mini Mountain FileSafe tapes set the industry-standard for fast, flexible backup of either IBM, AT&T, COMPAQ or Mountain hard disks.** Each provides full error correction (CRC) logic and a wide range of simple, menu-driven backup options.

*Every capacity not available for some computer models. Contact your dealer or call Mountain for details.
**QIC 24 interface. 450,000 installed in over 30% of all systems worldwide.



* registered trademarks and ** trademarks of Mountain Computer, Inc., American Telephone and Telegraph Co., International Business Machines Corp., COMPAQ Computer Corp., Microsoft Corp., Orchid Technology, and AT&T Bell Labs.
© 1985 Mountain Computer, Inc.

WIDEST RANGE OF OPTIONS.



DISK AND TAPE COMBINED? WE LEAVE NO STONE UNTURNED.

If you need *both* high-performance disk and tape, our FileSafe combo systems combine all the features of FileSafe hard disk and tape in one low-cost, compact unit.

A ROCK-SOLID REPUTATION.

Mountain's hard-earned reputation among business users over the last eight years for responsiveness, innovation and reliability means we'll be there when you need us.

YOU'LL LIKE THE VIEW.

Whether it's disk, tape, or a combination of the two, look to Mountain for the industry's widest range of proven, high-performance storage upgrades.

For more information and the name of your nearest Mountain dealer, call:

1-800-458-0300

(in Calif., 1-800-821-6066)

CIRCLE 293 ON READER SERVICE CARD



Mountain.
THE PEAK OF PERFORMANCE

Mountain Computer, Inc., 360 El Pueblo Road, Scotts Valley, CA 95066, (408) 438-6650, TWX 910-598-4504

Mountain East Coast Office: (404) 441-7661. Australia: Data Peripherals 02-888-5733.

Canada: Parity Plus, Inc. (416) 673-3321. France: Compusal 01-530 07 37. Spain: Chip Electronica 03-201-2266.

Sweden: Nordic Data 08-730 50 50. West Germany: Distec Datenysteme 6172-23-081.

For a 28" x 36" poster (suitable for framing) of "Sunrise at the Grand Tetons in Wyoming," write Mountain Computer, Inc.

SCREEN CAMERAS: AN OUTPUT ESSENTIAL

**YOUR PC MAY NOT BE THE BEST WAY TO DISPLAY IMAGES.
A SCREEN CAMERA WILL MAKE YOUR IMAGES PORTABLE.**

As computer graphics enjoys increasing use in the design industry, the practicality of strictly on-screen images is often questioned. One day, monitors may be an accepted form of presentation for computer graphics, but for the time being a piece of paper, slide, or print is accepted much more readily. Therefore, successful use of computer graphics usually requires a good camera or film recorder that will

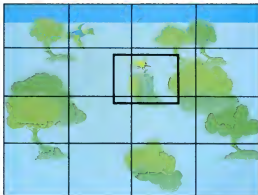
transfer the computer image onto film.

A regular hand-held 35-mm camera will not suffice; screen curvature, low display resolution, and environmental light and dust all degrade the resulting image. The best solution is to use a camera designed especially for recording images directly from a computer.

Because computers use different technologies to generate graphics, you must

be sure to buy a camera that will match your computer's technology. You need to consider not only the signal type—digital, analog, or composite—but the output in kilohertz. If you are sending a signal at 35 KHz to drive a high-resolution monitor, you will not be able to record an image with a 15-KHz-compatible camera. So always double-check compatibility. Let your supplier test the equipment and assume responsibility for selling it to fit your needs. Quite often a camera needs to be adjusted to achieve complete compatibility. Have your supplier take care of this adjustment, too.

Consider also the size or format of the film. Usually 35 mm will do. Some applications require a larger format: 4×5,



Figures A and B: This 2,000-line resolution raster graphics image (top left) was created in pieces. The original image was in 512-by-512-pixel resolution. That image was expanded using Lumens's high-resolution software package. Detail was then added to the high-resolution image in increments of one-sixteenth of a screen (top right). The user may choose which area to work on by viewing a full-screen representation of the high-resolution image and moving a scaled box over that area.

Figure C: An image created with Artwork can be recorded at 4,000-line resolution (left). The user views the image on-screen at 512-by-512-pixel resolution. When transmitted to the Matrix GCR, the image is filled out to 4,000 lines. The Artwork program is vector-based and allows proportional scaling of the entire object list to the high-resolution, 4,000-by-4,000-pixel screen. The quality of a 4,000-line image can be demonstrated with text. Artwork's fonts are composed of vectors that enable them to be scaled to any size and output in high resolution with smooth curves displayed from the vector instructions.

8×10, or 16-mm film for animation. Some screen cameras offer multiple formats by using interchangeable "backs." Each back is a different type of camera.

PC Magazine used three different types of cameras to record the illustrations in this issue: Photographic Sciences's DATACAM 35, which is handheld, but hooded, to record images from the *PC Paint* and *Videogram* software packages; Matrix Instruments, Inc.'s Model 3000 film recorder; and the Matrix QCR, which is a fully digital camera.

The DATACAM 35 is a simple 35-mm camera attached to a plastic hood, which eliminates impact from the environment such as glare from overhead lights. The camera focuses to the length of the hood. Reproduction from this camera is generally satisfactory, but the result is often somewhat distorted by the monitor's screen curvature.

The Matrix Model 3000 is an analog-type film recorder. It accepts an RGB analog signal from an analog monitor through standard BNC cables. The Model 3000 requires some adjustment to mesh with each individual system configuration.

Vincent Damiano, president of Imaging Dynamics, in Hicksville, N.Y., helped *PC Magazine* configure the Model 3000. It took him about 1½ hours to make the adjustments, without which the resulting screen photos would have been unusable. The levels of black, white, and gray and the contrast and exposure needed to be set. The Model 3000 comes with a table of recommended settings for each of these parameters, but the aid of a trained and experienced technician gave us excellent results immediately.

The Model 3000 offers excellent control over your images. You can create up to eight different sets of exposure controls and store them in memory, later to retrieve or change them as you need.

We were able to use only the digital Matrix QCR camera with *Artwork* and *Lumena*, because only these packages had Matrix QCR drivers (see Figures A and B). The QCR accepts a digital signal from your PC, XT, AT, or compatible through the Matrix QVP plug-in board. It

takes the digital information and displays it at 2,000 or 4,000 lines. This resolution is independent of the monitor's 512×512-pixel resolution.

Artwork's special driver software multiplies the vector instructions that create polygons (lines, arcs, and fills) and

You must be sure to buy a camera that will match your computer's technology.

assigns many more points to each shape. This very high resolution gives wonderful clarity to text and all shapes created in the viewable 512×512 resolution.

Lumena creates a high resolution image in raster format. The *Lumena* software enables you to create a window with one of 16 segments of a larger picture on the 512×512 screen (see Figure C). A special view mode in the software allows you to see the entire image in a simplified form, basically one of every 16 pixels. You see, in effect, a 2,000-line raster image. The results can be astonish-

ing for a PC. One would expect quality this high from larger minicomputers only.

Matrix is not the only company that produces quality screen cameras. Dunn Instruments, Inc. produces a number of analog film recorders. Among them are the Micro Color 35 mm, a no-frills, quality recorder, and the Multi Color 35 mm, which offers red, green, and blue editing for added imaging control.

Focus Graphics, Inc. manufactures the VideoSlide 35 with optional input configurations. Depending on your signal type, you can order it to be compatible with TTL, composite, or analog RGB adapters. Focus Graphics is also coming out with an IBM Enhanced Graphics-compatible camera, and a compatible camera for the IBM Professional Graphics system.

These products are all just part of a long list of cameras available in a wide price range. While cameras like the DATACAM 35 are fine for draft-quality work or quick proofs with instant film, you still have to spend a good deal of money to step up to higher quality cameras like the Matrix QCR. Before buying, you should be sure to define your film recording needs in terms of price and quality. Then seek out the camera that best suits those needs.—Gerard Kunkel and Heather Luchak

PC MAGAZINE

DATACAM 35
Photographic Sciences Corp.
770 Basket Road
Webster, NY 14580
(716) 265-1600

List Price: For 9-, 12-, and 13-inch models, \$875;
19- and 21-inch models, \$925.

Requires: QUP board.

CIRCLE 672 ON READER SERVICE CARD

Model 3000
Matrix QCR
Matrix PCR
Matrix Instruments, Inc.
1 Ramland Road
Orangeburg, NY 10962
(914) 365-0190

List Price: Model 3000, \$8,546, plus back; Matrix
QCR, \$21,300 plus back; Matrix PCR, \$11,795.

Requires: QUP board.

CIRCLE 671 ON READER SERVICE CARD

Micro Color 35 mm
Multi Color 35 mm
Dunn Instruments, Inc.
544 Second Street
San Francisco, CA 94107
(415) 957-1600

List Price: Micro Color, \$3,500; Multi Color,
\$4,500.

CIRCLE 670 ON READER SERVICE CARD

VideoSlide 35
VideoSlide 35 EGA
VideoSlide 35 Professional
Focus Graphics, Inc.
10 Twin Dolphin Drive
Redwood City, CA 94065
(415) 595-6920

List Price: VideoSlide 35, \$2,999 plus either TTL
board, \$400, RS170 board, \$500, or NTSC board,
\$550; EGA, \$3,999 complete; Professional, \$3,999
complete.

CIRCLE 669 ON READER SERVICE CARD

Eighties essentials:

✓ denotes IBM-AT compatibility.

SOFTWARE

We only carry the latest versions of products. Version numbers in our ads are current at press time.

Aptec	
✓Rainbow Writer Color Text Formatter 2.1	\$119
✓Rainbow Writer Screen Grabber 1.1	69.
✓ColorScreenPrint 2.0	59.
Ashton-Tate	
✓dBase III 1.1	call
✓Framework 1.1	call
Best Programs	
✓PCFixed Asset System 3.0	329.
✓PCTax Cut (for 1984 taxes)	49.
✓PCPersonnel (Level 1) 3.0	279.
✓PCPersonnel (Level 2) 3.0	419.
Bible Research	
✓THE WORD 3.0 (KJV Bible)	145.
✓THE WORD 3.0 (NIV Bible)	145.
Borland International	
✓Sidekick 1.5 (non-protected)	48.
✓Turbo Pascal 3.0	37.
✓Turbo Pascal 3.0 w/BCD	59.
✓Turbo 8087 3.0	59.
✓Turbo 8087 3.0 w/BCD	72.
✓Turbo Database Toolbox 1.0	30.
✓Graphics Toolbox 1.0	30.
✓Turbo Tutor 1.0	19.
✓Superkey 1.0	37.
Breakthrough	
✓Timeline 2.0	279.
Broderbund	
✓Bank Street Writer	49.
Connecticut Software	
✓Printer Boss 5.0	99.
✓Sideline 5.0 (more features than Sideways)	37.
Digital Research	
✓GEM Desktop 1.1	30.
✓GEM Draw 1.0 (includes GEM Desktop)	93.
FriendlySoft	
✓FriendlyWriter 2.0 (with FriendlySpeller)	55.
Funk Software	
✓Sideways 2.11	37.
Harvard Software	
✓Harvard Total Project Manager 1.0	279.
Hayes	
✓Smartcom II 2.1	89.
IMS!	
✓PC Paintbrush 2.8	69.
Infocom	
✓Comestone 1.0	279.
Litewise	
✓Volkswriter Deluxe 2.2 (with TextMerge)	159.
Living Videotext	
✓ThinkTank 2.0	109.
Micro Data Base	
✓Knowledgepman 1.07	249.
Micro Education (MECA)	
✓Managing Your Money 1.52	99.
✓Running Program (Jim Fixa) 1.2	49.

PC Connection Software Special through September 30, 1985

SOFTWARE DIGEST RATINGS NEWSLETTER

This publication is unparalleled for its comprehensive, reliable evaluations. Its analyses and reviews are completely unbiased—they accept no advertising. If you are preparing to make a substantial investment in one or more software programs, we recommend you read SOFTWARE DIGEST's evaluation first. 1985's issues evaluate the following programs: Word Processors, File Management, Database Management, Spreadsheets, Graphics, Integrated Accounting, Project Management, Communications, Integrated Productivity.

Single copy (specify topic)..... \$18.50.
(The cost of your first issue, \$18.50, can be deducted from the price of a year subscription)
Year subscription (10 issues)..... 185.
Actually includes 20 issues: the 10 previous issues, in a binder, and the 10 upcoming issues.

Micropro

✓WordStar 3.31	\$179
✓Hard disk recommended for Wordstar 2000 & Wordstar 2000 Plus	
✓WordStar 2000 1.01	259.
✓WordStar 2000 Plus 1.01	259.

Microlin

✓R-base 5000 1.0	389.
✓Extended Report Writer 1.2	85.
✓Clout 2.0	135.

Microsoft

✓Multiplan 1.2	125.
✓Microsoft Spell 1.0	30.
✓Microsoft Word 2.0	235.

Both of the following Microsoft mice now come with PC Paintbrush software

✓Microsoft Mouse with software 4.0	135.
✓Microsoft Serial Mouse with software 4.0	135.
✓Microsoft Project 1.01	155.
✓Microsoft Chart 1.01	155.

Microstuf

✓Crosstalk XVI 3.5	99.
✓Transporter 1.3 (includes Crosstalk)	169.
✓Infoscopia 1.0	129.

MultiMate International

✓MultiMate 3.3	call
----------------	------

Peter Norton

✓Norton Utilities 3.0	59.
-----------------------	-----

Powerbase Systems

✓Powerbase 2.1	239.
----------------	------

Rossoft

✓Prokey 4.0	89.
-------------	-----

Satellite Software

✓WordPerfect 4.0	\$239.
------------------	--------

Software Digest

Ratings Newsletter

Single copy	see special
Year subscription	see special

Software Group

✓Enable 1.1	319.
-------------	------

Software Publishing

✓PFS:File 8.01	84.
✓PFS:Graph 8.01	84.
✓PFS:Plan A:01	84.
✓PFS:Proof 8.00	59.
✓PFS:Report 8.01	77.
✓PFS:Write 8.01	84.

Virtual Combinations

Micro Cookbook	29.
----------------	-----

Warner Software

✓The Desk Organizer 2.0	69.
-------------------------	-----

TRAINING

ATI

SKILL BUILDER PROGRAMS

Intro and How To Use:

Word Processing	MS-DOS
Business Software	PC-DOS
Data Bases	Home Accountant
Compaq	VW Deluxe
IBM-PC	BASIC

each 32.

TRAINING POWER PROGRAMS

How To Use:

dBase II	dBaseIII	Lotus 1-2-3
MS Word	Easywriter II	Multimate
Multiplan	Supercalc 3	Framework
Symphony	Wordstar	TKISolver

each 49.

✓Survival Kit (includes Intro to the PC, Intro to PC-DOS, & Intro to Business Software) 79.

Individual Software

✓The Instructor II	35.
✓Professor DOS	47.
✓Tutorial Set (both items above)	75.
✓Professor Pixel	47.
✓Typing Instructor	39.
✓Training for Lotus 1-2-3	49.

Scarborough Systems

MasterType	35.
------------	-----

EDUCATIONAL

Barron's

Computer SAT	59.
--------------	-----

Designware

Spellchecker (ages 6 to adult)	25.
Mission Algebra (ages 13 and up)	27.

Digital Research

Diagnostic Test (PSAT)	14.
OwlCat SAT (15 hours)	63.
OwlCat SAT (60 hours)	169.

Harcourt Brace Jovanovich

Computer SAT	49.
--------------	-----

Simon & Schuster

Typing Tutor III	33.
------------------	-----

* DEFECTIVE SOFTWARE REPLACED IMMEDIATELY. DEFECTIVE HARDWARE REPLACED OR REPAIRED AT OUR DISCRETION. SOME ITEMS HAVE WARRANTIES UP TO FIVE YEARS.
©COPYRIGHT MICRO CONNECTION, INC. 1985. ALL ITEMS SUBJECT TO AVAILABILITY. PRICES SUBJECT TO CHANGE WITHOUT NOTICE.
Jr. CONNECTION and PC CONNECTION are REGISTERED TRADEMARKS, and MICRO CONNECTION is a TRADEMARK, OF MICRO CONNECTION, INC., MARLOW, NH.

PC CONNECTION®



PC Palace.

A man's phone is his castle.

Whether you call up on our toll-free number, or tool up in your private coach, PC Connection will roll out the red carpet. Because here under the majestic skies of Marlow, NH (pop. 547) we're offering a regal selection of PC add-ons and software at prices even a pauper can afford. Backed by warranties and support services as solid as the crown jewels.

My kingdom for a DOS.

You know the feeling of power you have when you first get a PC? You can do anything! In no time at all! Better than you've ever done it before! It's like being sixteen again.

But after a while, the novelty wears off. Things get ordinary. It's time to conquer new lands, learn new languages. It's time to call PC Connection. We'll make you feel like queen (or king) for a day.

Because our job is to figure out

how you can put your PC back on a pedestal without spending a king's ransom. We've checked out those new integrated software packages, we've tried those new printers, we've micro'd to mainframe, moused to menu, and modemed to more mailboxes than most might mention.

On your knees, bees.

When you call us, you not only get honest advice, you get some very sweet deals. Like the vessel of pure New Hampshire royal nectar we're sending free to everyone who places a \$500 order between now and September 30.

Just call 1-800/243-8088 or 1-603/446-3383, M-F 9:00 to 9:00; Saturday to 5:30. If you're planning to visit, call ahead to make sure what you want is in stock. The showroom closes at 8:00 M-F and at 5:00 on Saturday.



A container of PC Connection honey, featuring our most hair-apparent mascot. Free to all customers, but not commercial accounts. Limit one per customer.

For the IBM-PC (XT & AT) exclusively.

PC CONNECTION

se, economy.

capability. In addition, the LX80, FX85, and FX185 can all print in near letter quality (NLQ).

•LX-80	call
•RX-100	call
•FX-85 (replaces FX-80+)	call
•FX-185 (replaces FX-100+)	call
•JX-80	call
•LQ-1500 (letter quality dot matrix)	call
•Printer to IBM Cable (specify printer)	19

Hayes	
•Smartmodem 300	149
•Smartmodem 1200B	399
•Smartmodem 1200B (w/Smartcom II)	369
•Smartmodem 2400	399
•Smartcom II 2.1 (software)	89
•Curtis Smartmodem-to-IBM Cable	19

Hercules	
•Hercules Graphics Card (parallel port)	309
•Hercules Color Card (parallel port)	169
•Graph-X Software 2.0	42

IMSI	
•PC Mouse w/PC Paintbrush 2.8	119

Kensington Microwave	
•Masterpiece	94
•Printer/portable computer stand	17

key tronic	
•Deluxe keyboard (KB 5151)	169
•AT Converter (makes 5151 keyboards work with AT)	12

Kraft	
•Joystick	35
•Executive Cursor Control (software)	27

Maynard Electronics	
•Floppy Drive Controller	119

Mouse Systems	
•PC Mouse (w/software, pad, & PC Paint)	139

Orchid Technologies	
•All Orchid Cards come with PCnet Drive (Ram disk). PCnet spool (print spooling), disk caching, & partitioning	
•Blossom 64k upgradeable to 384k, with clock calendar, serial and parallel ports	
•PCnet Daughter Board (piggybacks to Blossom) with version 3.0 networking software	199

•PCnet Blossom 64k Blossom Board with the Daughter Board installed	call
•PC Turbo 186 w/128k	call
•PC Net (stand alone card)	call

Paradise Systems	
•Modular Graphics Card	275
•Multidisplay Card	195
•5-Pack (2K expandable to 384k) w/clock and serial port	169

Princeton Graphics	
•HX-12 RGB monitor (690 x 240)	call
•MAX-12E Amber monochrome monitor	call
•SR-12 RGB Monitor (690 x 480)	call
•Scan (II) Board for SR-12	call

Quadram	
•Expanded Quadboard with clock calendar, parallel, serial & game port, I/O bracket, and Quadmaster software	
•64k upgradeable to 384k	199
•384k (fully populated)	249
•Microtazer Printer Buffer (parallel) w/copy MP 64 (64k) upgradeable to 512k	159

•Quadcolor I	\$197
•Quadchrome RGB Monitor	469
SMA (Systems Management)	
•PC Document Keyboard Templates available for	
•DOS/Basic 1.1	Supercalc 3
•DOS/Basic 2.0-2.1	Wordstar
•DOS/Basic 3.0-3.1	Wordstar 2000
•Lotus 1-2-3	Turbo Pascal
•Symphony	WordPerfect
•Multiplan (IBM)	dBase II
•Multiplan (Microsoft)	dBase III
•Framework	Ultimate
•Volkswriter Deluxe	each 12
Talgrass Technology	
•TG 5025—25 meg hard drive w/controller and 60 meg backup unit	call
Toshiba	
•P351 printer	1129
•P1340 printer	569
WICO	
•Joystick	35

DRIVES

All floppy drives are completely pre-tested and are supplied with a printout of the test results. They are shipped with complete step-by-step installation instructions. Drives are 320k/360k

Control Data (CDC)	
•(5 1/4") half-height drive (DS,DD)	89
•(5 1/4") full-height drive (DS,DD)	99
•Free mounting bracket with each pair of half-heights	

IOmega	
•Bernoulli Box 20 Meg	2489
•10 Meg cartridge	48

Maynard Electronics	
•Internal Hard Disk (10 Meg) with WS-1 Controller	797

•Internal Hard Disk (10 Meg) with WS-2 Controller	\$ 969
---	--------

Tandon	
•TM 100-2 (5 1/4") full-height drive (DS,DD)	109
•10 Meg internal hard drive w/controller (complete package)	479

TEAC	
•FD-55B (5 1/4") half-height drive (DS,DD)	109
•Free mounting bracket with each pair of half-heights	

MEMORY

•64k Memory Upgrade Set for IBM-PC or XT system board (9 chips)	10
---	----

•64k Memory Upgrade Set for any memory board specify make of board (9 chips)	10
•Install memory upgrades & run diagnostics at time of board purchase only	10

•256k Memory Upgrade Set for any IBM-AT memory board (9 chips)	49
--	----

•128k Memory Upgrade Set for IBM-AT System Board (18 chips piggybacked)	49
---	----

DISKS

Fuji	
•Disks for IBM-AT (96-TPI) Box of 10	39

MAXELL	
•Disks for IBM-AT (96-TPI) Box of 10	45

Verbatim	
•DataLife Disks SS/DD Box of 10	21

•DataLife Disks DS/DD Box of 10	25
•Disks for IBM-AT (96-TPI) Box of 10	47

•Disk Drive Analyzer	19
•Flip Sort (holds 75 disks)	15

INFORMATION SERVICES

Compuserve	
•Compuserve Information Service (includes subscription, manual, 5 hours of connect time, monthly publications)	19

Source Telecomputing	
•The Source (subscription & manual)	39

Hardware and software specials for junior.

IBM taketh, but

JR. CONNECTION® still givesh away. Well, not quite giveth.

But this month we do have two specials to keep PCjr owners in the money and in the action.

First, we're continuing to offer Microcom's ERA 2 internal 300/1200 baud error correcting modem for just \$259. It features auto answer/auto dial, menu driven communications software, owner's manual, and four year warranty. You'll be able to send and receive messages and files as fast as the big boys in blue with this package, designed specifically for the PCjr.

And, for those of you who missed out on our springtime FINANCIERjr. special, we once again are offering it for \$19. This is the program that tells you everything you ever wanted to know about your home finances, but were terrified to ask.

Whatever your junior add-ons/software needs (or to receive our complete pricelist full of junior-compatible products), call the junior experts at 800/IBM-jrPC or 603/446-7761.

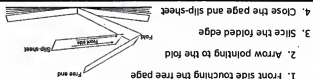
1-800/IBM-jr PC

Monday-Saturday 9:00-5:30

140MJ

CIRCLE 339 ON READER SERVICE CARD

PC CONNECTION®



4. Close the page and slip-sheet

3. Slice the folded edge

2. Arrow pointing to the fold

1. Front side touching the free page

2. Insert this sheet with

1. Open the foldout page

Inverted Foldout slip-sheet



GbaSlipSheet-001



Foldout slip-sheet

Folded edge of the page

1. Open the foldout page

2. Insert this sheet with

1. Front side touching the free page

2. Arrow pointing to the fold

3. Slice the folded edge

4. Close the page and slip-sheet



1. Follow instructions on the other side

Inverted Back



Gbs5tpBack-001B

Back

1. Follow instructions on the other side

efficiency, ea

Spinnaker

Educational Games for Young Computer Users. (All require graphics board)	
Delta Drawing (ages 4 to adult) ...	\$27
Snooper Troops I (ages 10 to adult) ...	23
Alphabet Zoo (ages 3 to 8) ...	20
Most Amazing Thing (ages 10 & up) ...	23
Face Maker (ages 3 to 8) ...	18
Kids on Keys (ages 3 to 9) ...	18
Fraction Fever (ages 7 to adult) ...	18
Kinder Comp (ages 3 to 8) ...	18

Springboard

Early Games for Young Children (ages 2½ to 6) ...	22
Stone (requires graphics board)	
My Letters, Numbers, Words (ages 1 to 5)	29
Kids Stuff (ages 3 to 8) ...	29
Across the U.S.A. (ages 5 end up) ...	22
The Learning Company	
Magic Spells (ages 6 to 10) ...	23
Word Spinner (ages 6 to 10) ...	23

GAMES

Blue Chip	
Millionaire ...	32
Tycoon ...	32
Baron ...	32
Broderbund	
Lode Runner ...	25
FriendlySoft	
FriendlyWare/PC Arcade	35
Hayden Software	
Sergon III ...	35
Infocom Difficulty levels shown in <i>italics</i>	
Seestelker (junior) ...	25
Enchanter (standard) ...	25
The Witness (standard) ...	25
Planetflat (standard) ...	25
Cutthroat (standard) ...	25
Hitchhiker's Guide (standard) ...	25
Zork I (standard) ...	25
Zork II (advanced) ...	29
Zork III (advanced) ...	29
Infidel (advanced) ...	29
Sorcerer (advanced) ...	29
Suspect (advanced) ...	31
Deadline (expert) ...	31
Stercross (expert) ...	31
Suspended (expert) ...	31
<i>Invisclues (hint booklets) are available for most Infocom games. Specify game.</i>	7
Microsoft	
Flight Simulator 2.12 (now works with Hercules Mono Card) ...	32
Origin Systems	
Ultima III ...	39
PCSoftware	
Armchair Quarterback ...	27
Chess 2001 ...	23
Championship Blackjack	23
Professional Software	
Twine Fever ...	22
Str-Tech	
Wizardry ...	42
Spectrum Holobyte	
GATO ...	27

PC Connection Hardware Special

through September 30, 1985

CURTIS MANUFACTURING

The Crystal

(Brown-Out Protection Device)
Experts are predicting that during the summer and fall of '85 the incidence of brown-outs will exceed that of phone line disturbances (is that possible?)

- Protects during power sags (brown outs)—although it is NOT A POWER BACKUP
 - Protects against surges (over-voltage)
 - EMI/RFI filtering
 - Safety amp meter indicates overloads
 - Unit has four outlets with one on/off switch
 - Lifetime warranty
- | | |
|----------|-------|
| 150-watt | \$123 |
| 300-watt | 146 |

OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for charge cards
- Your card is not charged until we ship
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order
- No sales tax.
- All shipments insured; no additional charge
- Allow 1 week for personal and company checks to clear.
- UPS Next-Day-Air available
- COD max: \$1000 Cash or certified check
- 120 day guarantee on all products *
- To order, call us anytime Monday thru Friday 9:00 to 9:00, or Saturday 9:00 to 5:30
- You can call our business offices at 603/446-3383 Monday thru Friday 9:00 to 5:30

SHIPPING

Continental US: For monitors, printers, and drives, add 2% for UPS ground shipping. Call for UPS Blue or UPS Next-Day-Air. For all other items, add \$2 per order to cover UPS shipping. We will automatically use UPS 2nd-Day-Air at no extra charge if you are more than 2 days from us by UPS ground.
Hawaii: For monitors, printers, and drives, actual UPS Blue charge will be added. For all other items, add \$2 per order. **Alaska and Outside Continental US:** Call 603/446-3383 for information

1-800/243-8088

PC Connection

140M

6 Mill St., Marlow, NH 03456

603/446-3383

Sublogic

Night Mission Pinball	\$29
Jet	33

HARDWARE

AST Research (For IBM-PC, XT or AT)

All AST Boards come with SuperDrive, SuperSpool, and one year warranty.
SuperPakPlus 64k upgradeable to 384k, with clock calendar, serial and parallel ports & now includes Borland Sidekick version 1.5 (non-copy protected) game port optional 229 384k (fully populated) ... 269
MegaPlus II 64k upgradeable to 256k (or more with MegaPak) with clock calendar and serial port (parallel, game, or second serial port optional) ... 249
MegaPak 128k (not upgradeable) ... 159
MegaPak 256k ... 249
I/O Plus II with clock calendar and serial port (parallel, game, or second serial port optional) ... 125
Parallel, Game, or second Serial Port for any AST board (specify board) ... 35
Connectal connector bracket (PC only) ... 19
AST-5251-12 ... 529
AST-5251-11 ... 567
AST-3780 ... 589

Reach Modem (half card 300/1200 baud internal modem includes Crosstalk XVI) 389
Advantage 128k upgradeable to 1.5 Meg (more with Piggyback Card), with clock calendar, serial and parallel ports game port optional ... 399

Amdak

Video 300G monitor (green) ...	139
Video 300A monitor (amber) ...	149
Video 310A monitor (amber) ...	179
Color 600 - RGB monitor ...	399

CompuCase

Plastic Keyboard & Drive Cover Set ...	17
IBM Mono Screen Enhancement ...	17

Curtis

ACCESSORIES

PC Pedestal (for IBM Mono or Color) ...	37
PGS or Quadchrome Adapter for above ...	9
Low Profile Tilt and Swivel Pedestal ...	37
AD-2 Adapter for Portables ...	15
System Stand ...	19
System Stand for IBM-AT ...	37
Static Mat ...	27

The Crystal 150-watt	special
The Crystal 300-watt	special

CABLES

Extension Cables for IBM Mono Display ...	33
Keyboard Extension Cable (3 to 9 feet) ...	27
AC Plug Adapter (any monitor to your PC) ...	8
Printer to IBM Cable (specify printer) ...	19
Smartmodem to IBM Cable ...	19

SURGE SUPPRESSORS

All surge suppressors have an on/off switch.	
Diamond (6 outlets) ...	32
Emerald (6 outlets, 6 ft cord) ...	39
Sapphire (3 outlets: EMI/RFI filtered) ...	52
Ruby (6 outlets: EMI/RFI filtered, 6 ft cord) ...	59

Epson

All Epson printers have built in graphics

For the IBM-PC Exclusively.

PC CONNECTION®

it, and touching up enlarged sections—and End the Program. Except for End the Program, each icon calls up its own submenu of icons for related functions.

Videogram's particular strengths are its many tools for moving and interweaving images among the screen, memory, and storage. For example, unlike some systems that require you to use a separate program to create an on-screen slide show, you can put together a sequence of images by using *Videogram's* slide-show creation function, which you can access from the Output menu. You can also combine stored and on-screen images by using the "cut-from-memory" function: simply select a portion of the picture that is in memory and paste it anywhere on the current illustration.

The cut-from-memory function is also useful as a preliminary to the "superimpose" feature. After selecting a portion of the image in memory, you can cancel out any of its colors or make them transparent, then superimpose the remaining image onto the current picture.

Another unusual feature is the flexible type-font utility. *Videogram's* 42 fonts include roman, bold, and Helvetica, as well as one made of stripes. A simple text style can appear upside down or read from the right instead of the left. Any of the fonts can be enlarged, outlined, or filled with any color.

What It Can Do

The EGA's 64 colors are actually 16 colors with four hues each. Any 16 of the 64 can appear on-screen at one time. When you select the COLORS command, the 16 color squares of the palette line up in a column along the right side of the screen. Place the cursor on one of these, and it will be outlined in white to indicate that it is current. To cycle a color through its four hues, touch either the plus or minus sign box at the top of the column. Since *Videogram* uses color mapping, any change in the color's hue will also automatically be registered in your image.

Cindy Lorimer, the artist who tested *Videogram* for this review, discovered that she needed all of the program's coloring components to create her CompuKids advertisement. Using the fill feature, she quickly tinted the children's blocks and the

bar graphs, then tested different combinations of colors with the helpful recolor feature.

When you select recolor, a second palette appears next to your primary one and displays just the colors that are in your image. (Lorimer said she would have liked this second palette to appear whenever you request the original color palette.) Suppose

Videogram's particular strengths are its many tools for moving and interweaving images among the screen, memory, and storage.

you want to recolor all the azure blues in your picture to purple: First select the azure blue square on the second palette, then select the purple square on the original, full palette. The blue square will now turn purple—and, if you like, you can adjust its hue. When you touch CONFIRM, the section of the image that you demarcate will be recolored.

As Lorimer played with *Videogram*, she found that she could use several of the tools in concert to create and apply patterns to a picture. For example, to create an original fill design for the drawing of a swimsuit, she took a permanent pattern from the Brush menu and manipulated it until it became her own.

Then, instead of carefully painting the pattern onto the swimsuit, Lorimer used the superimpose feature. First, she made the suit transparent, then placed the transparent buffered copy of the swimsuit over the new pattern. Since the swimsuit was the only transparent part of the image, it was the only area in which the pattern showed through.

The font feature made it easy to place type on the CompuKids logo. Though the type can be increased or decreased in size, it always retains its original proportions. Lorimer used the "rubberband" box to set

the size and position of the type; when she touched CONFIRM, the type appeared on the screen.

To create the basic shapes of the CompuKids logo, Lorimer used the circle and horizontal-line icons, and then used the fill feature to color the body of the letters. To paint the letter tails in several colors, she first filled them with solid color, then used the magnify feature—which enlarges the pixels as if they were under a magnifying glass—to view the pixels and vary their colors individually.

Practical Problems

Whatever difficulty Lorimer had painting her images was not due to the *Videogram* software, but to the IBM Enhanced Color Display. In order to get all four hues of each color, the adjustment knob had to be turned all the way to the right; however, doing so considerably decreased the sharpness of the image, especially when lettering was involved. Lorimer found that when clarity was her top priority, she had to settle for two out of four hues. This problem has been reported with a number of Enhanced Color Displays. If you are thinking of buying one, carefully check for a decrease in screen sharpness as you increase the number of hues, or consider shopping for one of the compatibles, such as the Princeton monitor.

Another problem, however, did involve a *Videogram* procedure. The Shapes menu contains icons for a circle, horizontal and vertical lines, a box, a triangle, a variable grid, and one called "lines" that draws a series of lines radiating from a central point. While this feature worked well, Lorimer found it was necessary to confirm each line placement individually—a process she found tiring and repetitive.

Ergonomic Issues

Lorimer's objection to the use of CONFIRM typifies a number of small, but nagging ergonomic problems that make *Videogram* less smooth than it could be. The format of all the menus requires touching CONFIRM to inform the system that you have made your final decision. However, the command doesn't automatically take you back to your image so you can continue drawing: You must first touch the MENU command. Combining these steps

would make the procedure faster and smoother.

After using *Videogram* for a while, you begin to feel that it has too many levels of menus. One solution might be to remove the MENU command from the command line at the top of the screen and replace it with the menus it currently calls up: Input, Output, Tools, Screen Operations, and End the Program.

Another consideration is the distance you must travel when you select certain elements on the screen in succession. This distance is most noticeable when you're working with the filenames in the Input and Output menus. The icons and the CONFIRM command are on the right side of the screen while the filenames are on the left, with nothing but wide open space in between. All this travel time across the digitizer adds up.

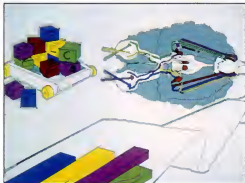
It would help to have a name or icon on every screen that identifies the menu or submenu currently in use. Also, when you're saving an image to memory, it's sometimes difficult to know whether the image on the screen is the one in memory or the current working image. This is information that the program must keep track of, so there's no reason why it can't inform you as well.

Conclusion

Videogram cannot do advanced manipulations that are beyond the capacity of the EGA—such as enlarging picture elements or rotating sections of the screen—but Sofiel does seem to have a very clear idea of what the EGA can do and has designed *Videogram* to take full advantage of its features. ■

ABOUT THE ARTIST

Cindy Lorimer studied art in Los Angeles before traveling to New York to study modern dance. She then completed a B.A. in psychology at New York University with a minor in biology. She is working as a free-lance computer graphics artist in the medical and scientific communications field. Her graphics are currently being used in an interactive computer/laser-videodisc cancer management program.



While *Videogram*'s main menu is a row of words that remains on-screen at all times, the submenus are icons. *Videogram* uses IBM's EGA board, which gives you 64 colors to choose from, with up to 16 colors on-screen at one time. The EGA's resolution of 640 × 200 enabled artist Cindy Lorimer to draw a rather complex drawing.

After sketching out the illustration and filling in blocks of color, as shown in the middle photograph, Lorimer used the magnify operation to expand the blocks and clean up their outlines. She used recolor function to change the background to blue.

Videogram offers 42 typefaces, and Lorimer used several of these. Lorimer used the shape function to design the *CompuKids* logo. She created it on a separate screen, then used the cut-from-memory function to combine it with the main image.



Compare the Hercules Color Card to IBM's.

Five reasons why the Hercules Color Card is better.



IBM Color Adapter \$244



Hercules Color Card \$245

- | | | |
|------------------|--|---|
| 1. Compatibility | Runs hundreds of graphics programs. | Runs the same hundreds of graphics programs. "The Hercules Color Card is so nearly identical to the IBM Color/ Graphics Card that it's almost uncanny." PC Mag. |
| 2. Printer port. | None. | Standard. Our parallel port allows you to hook up to any IBM compatible printer. |
| 3. Size. | 13.25 inches. Limited to long slots. | 5.25 inches. Fits in a long or short slot in a PC, XT, AT or <i>Portable</i> . |
| 4. Flexibility. | Can't always work with a Hercules Graphics Card. | Always works with a Hercules Graphics Card by means of a software switch. |
| 5. Warranty. | 90 days. | Two years. |

Any one of these five features is enough reason to buy a Hercules Color Card. But perhaps the most convincing reason of all is just how easy the Hercules Color Card is to use: "Right out of the box, the Hercules Color Card goes into an empty expansion slot, ready for you to plug in. . . and go to work—no jumpers, no software. For most applications, it's just that easy." PC Magazine.

Call 1-800-532-0600 Ext. 420 for the name of the Hercules dealer nearest you and we'll rush you our free info kit.

Hercules.
We're strong on graphics.

A Partner in GRAPHICS



The Grafix Partner can sit in the background to help you jazz up the graphics output from your spreadsheet. Or it can stand right up in front as a superb freehand drawing tool.

After all the trouble software developers take to include graphing capabilities in their spreadsheet packages, most business users still send their spreadsheet's graphic output through the art department before they're ready for a presentation. Admittedly, spreadsheet graphics are designed primarily to be accurate and informative; they are rarely eye-catching or beautiful. Generally, these programs produce flat, two-dimensional renderings of the facts and offer you a limited number of options for type styles, fill patterns, or colors.

The *Grafix Partner* from Brightbill-Roberts, however, lets you bypass the art department and spruce up your spreadsheet-generated graphics. And you don't even have

to exit the original program. This program runs as a background utility, and, with the tap of a few keys, you can invoke it and enhance your graphics directly on-screen. The *Grafix Partner* gives you access to twenty different type styles, an infinite variety of fill patterns (you can even design

your own), and various freehand drawing options (dots, lines, boxes, circles, and a paintbrush feature). After you enhance your spreadsheet image, you can print it out, save it as a *Grafix Partner* file, and then return to the original spreadsheet simply by pressing the Escape key.

The *Grafix Partner* works with any program that produces a graphic image on the PC's screen, including other drawing and drafting programs as well as general spreadsheet programs with charting capabilities.

However, it also runs as an excellent standalone freehand drawing program. The disk includes a small library of amazing examples of what can be done with the program: several state outlines, three-dimen-



The *Grafix Partner* lets you combine charts and drawings on the same screen.

sional and illustrative bar graphs, and free-hand sports illustrations. A utility called CYCLE lets you link a series of images as a slide show that will flash on the screen in sequence at whatever time interval you select. The FONT utility lets you create your own fonts or edit any of the 20 fonts that come with the program. Also included in the package is a program on a separate disk called *The Plotter Partner*, which lets you send your *Grafix Partner* picture out to a plotter. But first, let's take a look at how the program works in its most useful role: a background utility.

Background in Motion

To run *The Grafix Partner* as a background utility to another package, you simply select the background option when loading *The Grafix Partner*, then start the other package (such as Lotus's 1-2-3) as you would normally. You can go ahead and build your spreadsheet, for instance, then create a chart based on the entered data. When the chart is displayed on screen, you press Ctrl-Alt-plus sign (+ on the numeric keypad) to activate *The Grafix Partner*. You can toggle back and forth between the drawing area and the command menu by pressing the numeric plus-sign key. All the program's drawing options, editing options, fonts, patterns, and colors are available in background mode, and you can move, edit, or delete elements of the chart created by the originating program (see Figure 1).

When you are finished editing the

The *Grafix Partner*'s "up-end" function lets you flip duplicates of picture elements on their horizontal axes; a mirror function lets you flip duplicates on their vertical axes.



graph, you save it as a *Grafix Partner* picture and return to the program you were in by pressing the Esc key. The program can be called up again any time graphics are on-screen by again pressing Ctrl-Alt-plus. Graphics, not text, must be on-screen when you call up *The Grafix Partner*, or you'll get some bizarre effects; you might even crash the entire system.

Standing Alone

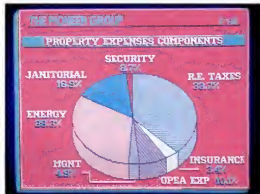
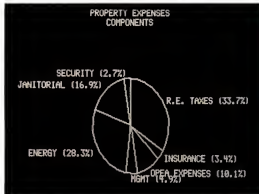
The Grafix Partner comes on one disk, which can be duplicated or copied onto a hard disk. The original program disk must be in drive A:, however, whenever the program is loaded. With *The Grafix Partner* in standalone drawing mode you use the numeric plus-sign key to toggle back and forth between a full-screen drawing

area and a menu screen just as in background mode. Most of the drawing options (such as drawing a box or a circle) and block editing options (such as copy, erase, zoom, and so on) can be activated directly from the drawing screen without returning to the menu.

The program supports a mouse, lightpen, or joystick as well as keyboard input. Using keyboard entry, the cursor-control keys move the drawing cursor up, down, left, and right and the numeric-pad numbers 1, 3, 7, and 9 move the cursor diagonally. The program includes standard drawing tools that you activate with one-character commands, moving the drawing cursor on-screen, and setting markers with the space bar to create lines, boxes, and circles. Drawing a shape is simple: For example, you draw a line by moving the drawing cursor to one endpoint, pressing the spacebar (or clicking a mouse button), then moving the cursor to the other end point and again pressing the spacebar. A line will then appear between the two points. The backspace key acts as an undo command after most drawing operations.

Putting up a Font

The Grafix Partner contains a library of 20 different fonts (see Figure 2). Text is placed on-screen below the cursor, which makes it tricky to line up. Only one font can be loaded at a time. If you want to change fonts, you must return to the menu, select the I/O operations option, and load the desired font. You may ask to see a di-



Figures 1a and 1b: Left, a chart created with Lotus's 1-2-3; right, the same chart as enhanced by *The Grafix Partner*.



Figure 2: The Grafix Partner includes a library of 20 different fonts to choose from, including serifed and nonserifed faces.

rectory of available files; however, the directory does not remain on-screen while you type in the name of the font file you want, so you have to write down or remember the font name; this type of menu operation is fairly awkward. The limitations of text placement and selection, however, are certainly offset by the fact that you can use such a wide variety of fonts to enhance your graphics. The FONT utility lets you modify existing type styles or even design your own character sets, including symbols, in sizes from 6×6 to 20×24 pixels (see Figure 3).

Block operations allow you to erase, copy, or move areas of pictures. An "up-end" function lets you flip duplicates of selected elements on their horizontal axes; a mirror function lets you flip duplicates on their vertical axes. The "form transfer" option lets you merge any stored image into the current drawing area. For example, you can copy an image of a football player onto a graph of completed passes (see Figure 4). You can select part of any image and store it as an individual file or merge it with other files. The Grafix Partner's disk includes a screen-full of common symbols that you can use in the pictures you build. Unfortunately, you can't change the size of a Grafix Partner image or object; if you want another tree in the landscape

you're drawing, slightly smaller and to the left, you'll have to draw it from scratch.

Zooms and Fills

A zoom function lets you work on selected elements of your image at an enlarged pixel level. You can design your own black-and-white fill patterns by setting pixels on and off in an 8×8 pixel matrix. You can save any number of fill patterns to disk, but only four different fill patterns can be loaded at one time. In addition to black-and-white fill patterns, 16 different colors are available, but you can load only one four-color palette at a time. Unless you add a 16-color board, the IBM PC is limited to one background color and

three foreground colors, and the foreground colors available through The Grafix Partner are limited to two sets: cyan-magenta-white (the default set in background mode, that matches the 1-2-3 palette) or green-red-brown-yellow (the default set in standalone mode). Once you select a color or pattern (by pressing one of the function keys), you can fill areas of the screen image with that color or pattern by positioning the cursor inside a shape and pressing the paint command key, which is a mnemonic P.

The program is relatively easy to learn and use, with only 15 commands controlling 95 percent of normal operations. Producing complex images (like a drawing of

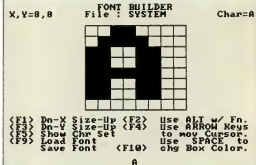


Figure 3: Using The Grafix Partner FONT utility, you can either modify existing fonts or design and build your own.

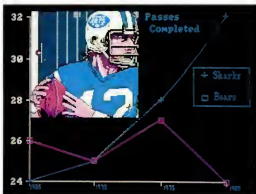


Figure 4: With The Grafix Partner "form transfer" function, you can merge stored images into the current drawing area. Here, a football player image has been copied onto a graph of completed passes.

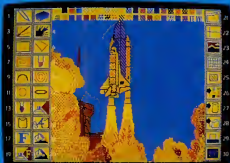
a baseball player with a grandstand in the background that is included in the disk's library of examples) might require a lot of time and talent, but the results are worth the effort. It will not take you long to get up to speed using the program. The documentation is adequate, but its explanations are rather brief and it has no illustrations whatever. Sequences of required keystrokes are embedded in explanatory paragraphs and are sometimes difficult to locate. A quick-reference chart might be helpful. All of the information necessary to use the program is in the manual; a little digging may be required, though, especially in the beginning. Before

We did for Graphics what Borland did for Desk Utilities...

INCLUDES
LOTUS®
SCREEN
CAPTURE



1. Select
2. Erase
3. Rotate
4. Fill
5. Line Draw
6. Box
7. Rubber
8. Line
9. Connector
10. Spiral
11. Marker
12. Arc
13. Connector
14. Circle
15. Ellipse
16. Custom
17. Spiral
18. Arrowhead
19. Clipboard



20. Cut and Paste
21. Points
22. Sweep Fill
23. Brush
24. Points
25. Fill
26. Dictionary
27. Paste
28. Finder
29. Background
30. Grid Lock
31. QuickSave
32. Rotate
33. Save/Load
34. Clip Art
35. Save/Load
36. Patterns
37. Printer
38. Exit

PARTNER IN GRAPHICS

you try building an image, it is helpful to use the CYCLE program to display all the images that come on the disk in an on-screen slide show to see what's possible.

The *Grafix Partner* is an efficient, inexpensive solution to most complaints about spreadsheet-generated charts and graphs. You don't need a more elaborate standalone graphics program, and you don't need to recreate your spreadsheet graphics from

The *Grafix Partner* is an efficient, inexpensive solution to most complaints about spreadsheet-generated charts and graphs.



scratch to get presentation-quality images. The simplicity of the program makes it suitable for anyone interested in quick chart enhancements, and experienced artists/operators will be able to produce detailed pictures with *The Grafix Partner*.

Considering the program's low price, any limitations blend into the background as easily as the product itself does. Even if you have a graphics package, you may find the added features of *The Grafix Partner* worth the \$150 investment.

Diane Burns and S. Venit are frequent contributors to PC Magazine.

PC FILE

The Grafix Partner
Brightbill-Roberts, Ltd.
Suite 421
University Building
120 E. Washington St.
Syracuse, NY 13202
(315) 474-3400
List Price: \$149, including *Plotter Partner*

Requires: 128K RAM in standalone mode, 60K in background mode; one disk drive; DOS 2.x, color/graphics adapter, color monitor.

CIRCLE 697 ON READER SERVICE CARD

We made it affordable...

\$49.95

IBM PC, PCjr, XT, AT (and compatibles), 128K RAM, One Double Sided Disk Drive, Color Graphics Adapter, Graphics Monitor, Mouse or Tablet (optional), DOS 2.0 or higher

Spectrum HoloByte

SPECTRUM HOLOBYTE, INC., 1050 Walnut, Suite 325, Boulder, CO 80302 (303) 443-0191. Check your local computer store or wherever software products are sold. Dealer inquiries call: (800) 627-8385 x262. Program by Migraf, Inc. (Written by Rick Minicucci and designed by Glenn Williams.) Suggested retail \$49.95. IBM is a registered trademark of International Business Machines Corporation. Borland is a registered trademark of Borland International Inc.



THE GRIZZLY™ MAKES BLACKOUTS BEARABLE.



No one can hold a candle to The GRIZZLY.™

It's the one Backup Power Supply System that gives your hardware, software and data *complete* protection against blackouts, brown-outs and power sags as well as surges.

When your power goes down, the advanced VRS technology of The GRIZZLY™ provides an instant switchover to battery backup, while it warns you with an audible alarm, giving you ample time to calmly shut down your computer

system to avoid damage or critical data loss. Even momentary voltage fluctuations, which constantly occur, are tamed by The GRIZZLY. The Pulse Width Modulated, regulated output is your assurance that you receive constant, stable, clean power.

The GRIZZLY VRS, available in 200W, 300W, 500W, 1000W and 2000W models. Each tested for complete reliability and designed for ease of use. Just plug it into

any standard three-wire grounded outlet, switch it on and you have all the power of the king of the forest.

DON'T PLUG IN WITHOUT THE



35 Dunham Rd., Billerica, MA 01821
(617) 663-0017 • 1-800-343-1813

CIRCLE 197 ON READER SERVICE CARD

You need a plotter that's compatible with your hardware, software and, especially, you.

More and more companies are discovering that color graphics help them communicate faster and more persuasively.

When you make this discovery, you'll want a Colorwriter™ pen plotter from Gould. Because Colorwriters are easy to use, and can meet all of your business and technical graphic needs. They'll work with virtually any computer and the most popular software packages available.

Whether you want simple bar charts or complicated CAD/CAM drawings in 8½" x 11" or 11" x 17" formats,

we've got a plotter to suit your needs and your budget. Plus, we've got a unique automatic chart advance option for volume graphics applications.

When you buy a Gould Colorwriter plotter you're getting 45 years of proven experience in hard copy graphics technology. That's why you also get one of the best warranties in the business.

For more information and the name of the Colorwriter dealer nearest you, call toll free **800-447-4700**, operator 99. Or write Gould Inc., Recording Systems Division, 3631 Perkins Ave., Cleveland, Ohio 44114.



**Gould
Colorwriter.
The compatible
plotters.**

CIRCLE 232 ON READER SERVICE CARD



GOULD
Electronics

Add-Mem's PC Memory Enhancement kit combined with IBM's BIOS kit now allows you to transform your 64K PC into an up-to-date 256K PC.

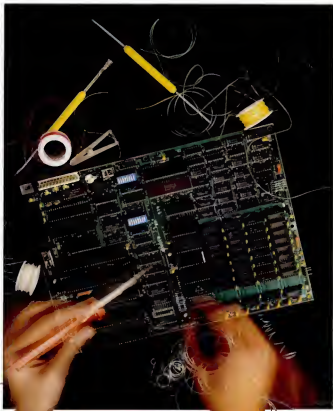
Upgrading Your 64K PC

Do you own a pre-March 1983 PC whose system board can hold only 64K of RAM? If so, you're among an unlucky crowd of 400,000 pioneers who own these relics. Problems you share include a lack of expansion slots and a power supply that must strain and struggle to put out enough juice for all your extra components.

If you have steady hands and nerves, you can update your system by adding a PC System Memory Enhancement board (from Add-Mem in Castro Valley, California). The unit, available as a kit, can be installed without the use of one of the five add-on slots on your PC's system board. If you combine this modification with IBM's ROM Bios Upgrade kit (see sidebar), you'll have converted your old-fashioned PC into a thoroughly modern 256K PC.

PC Grows Up

The original PC released by IBM in 1981 accommodated only 64K of RAM on its system board. IBM-watchers have speculated that this design was supposed to keep the initial system costs down and to encourage low-budget purchasers. The original PC's 16K RAM was installed in four banks of nine 16-kilobit chips each, eight for each of the eight data bits and the remaining chip for parity checking. The updated PC that was shipped after March



Photograph: Craig Cutler

1983 replaced the 16K chips with 64K chips in four banks, allowing for a total of 256K RAM. To find out which model you have, slide open the cover of your system unit, and you'll find the Board ID inscription on the far left side of the system board. If you have an old-style system board, 16KB-64KB CPU will appear in white lettering. If you have the current model, you will see 64KB-256KB CPU.

Updating with the Add-Mem Board

Replacing the 16K chips with 64K chips would seem to be the obvious solution to updating your system. This, however, is prohibited for two very good reasons. The first bank of chips (known as bank 0) is soldered in during assembly. Removing a soldered chip or other component is difficult without proper knowledge and specialized tools. The structure and power requirements of the two types of chips also differ in basic ways. Though they both have 16 pins, three of these pins have different functions in the 64K chip. The 16K chip uses three separate power lines, including +5 volts, -5 volts, and +12 volts, whereas the 64K chip uses only +5 volts, and coincidentally uses less power per chip than the 16K components. The 64K chip also has an additional address line not used in the 16K chip. (See Figure 1.) Inserting a 64K RAM chip into a socket intended for a 16K chip would destroy the integrated circuit (and possibly do damage to the system board and power supply) as soon as power was turned on.

Add-Mem's solution to the problem is to circumvent the soldered-in 16K chips by cutting certain "traces" (power and address lines) on the system board, removing the socketed 16K chips, and plugging the Add-Mem Board into the remaining 16K

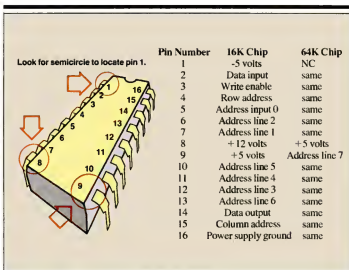


Figure 1: Physically, 16K and 64K RAM chips look exactly alike, having two rows of eight pins each. The internal pin connections and functions (with differences shown here) are what make these chips incompatible and the Add-Mem installation necessary.

sockets as one "giant chip" that can hold 256K RAM. The soldered-in 16K chips do not have to be removed; they're simply bypassed.

Add-Mem's solution allows you to give your 64K PC the same system board memory configuration as a 256K PC without taking up an expansion board slot. But the board may possibly have expansion-board clearance problems.

Making Clearance

Installing a printed circuit board and sockets over the existing 16K chips and sockets increases the height of the memory banks on the system board. This increase in height makes it physically impossible to install certain low-slung expansion boards into the three sockets in line with the system memory (see Figure 2). Many users will not be especially troubled by this restriction. Most PC boards are "high-slung," and the few low-slung boards that can't be installed (such as the IBM Color/Graphics Adapter) can be mounted in one of the two expansion slots that are not affected by the Add-Mem board.

Another solution to the height problem

is to solder the 64K chips directly to the Add-Mem board, thus eliminating the extra height of the new chip sockets. This procedure should be simple for anyone with kit-building experience, and if done with "burned-in" chips (chips previously used in a PC that have shown no errors), it is perfectly safe.

A third possibility is to mount the new 256K memory board in an out-of-the-way location (for example, in an upright position next to the left-hand disk drive unit) and run the necessary connecting wires to the system board itself.

Installing the Add-Mem board requires at least some experience in electronic kit building, preferably in digital circuits, and a few basic tools. These include screwdrivers, a soldering iron, an ohmmeter (for checking continuity and possible shorts), and a pair of narrow-tip diagonal cutters for cutting leads off of chips soldered into the PC's system board. If the thought of cutting and removing leads from the sacrosanct motherboard makes you queasy, enlist the help of someone with board-modifying experience.

If you're faint-of-heart, Add-Mem will

PCM-PC Memory Enhancement Kit
 Add-Mem
 22151 Redwood Rd.
 Castro Valley, CA 94546
 (415) 886-5443
List price: \$75.95 unassembled, \$99.95 assembled
Requires: IBM PC Version 1.0 (with 64K System Board).
 CIRCLE 650 ON READER SERVICE CARD

do the installation at a cost of \$350 for a filled 256K system board with no add-on board clearance problems. Parts and labor are guaranteed for 90 days (just like IBM's). An already assembled updated board is also available if you can't afford the 2-day waiting period between receipt of your old system board and completion of Add-Mem's modifications.

Add-Mem claims that the entire installation procedure takes just 1½ hours. If you include time for head-scratching and rereading the instructions, however, the average PC user will need three to five times that long.

Putting the Pieces Together

Feeling that rewiring part of my system board could certainly be no more dangerous than hitting the San Diego Freeway at 5 p.m. on a Friday, I opted for Add-Mem's PBM-KPC Kit (\$75.95). I did question, however, how someone whose electronic experience ended with building a DynaKit Tube Audio Amp in 1968 could tackle a PC's digital intricacies.

The Add-Mem kit consists of a small piece of printed circuit board that has been

Most pictures may be worth 1,000 words, but the diagrams accompanying the Add-Mem kit set the estimate back by about 995 words. The actual diagram of the Add-Mem board is a disaster.

wired and drilled to hold four banks of 64-kilobit RAM chips, 36 16-pin sockets (for the chips), 29-pin sockets (hollow pins that connect certain leads from the chip sockets on the Add-Mem Board to the PC's system board), 36 capacitors, and a single 30-ohm resistor. The instructions consist of 16 mimeographed pages and five illustrations, most of which were photocopied directly from IBM's *Technical Reference* manual (an interesting point considering that the instruction package sported a "Purple Computing" copyright notice). Installation is explained in 28 numbered

steps. These cover removal of the system board, pulling the socketed 16K chips, cutting three traces and three support chip pins on the system board, lifting cut pins and soldering wires from the new Add-Mem board to these pins and to what were referred to as "feed-through holes." Most steps are explained clearly and are accompanied by a step-by-step technical explanation in the manual's appendix.

Most pictures may be worth 1,000 words, but the diagrams accompanying the Add-Mem kit set that estimate back by about 995 words. The actual diagram of the Add-Mem board is a disaster. It is no more than a photocopy of the board itself with vague scribbles representing pin sockets and layout instructions. Some of the patches applied to the back of the PC's system board were obviously changed in mid-course, perhaps in a hurry, since the diagram shows traces of notes that were subsequently scratched out. Some wire connections to the board ambiguously labeled in my copy of the instructions have been corrected in the latest revision, although the scribbles and the dreadful board-installation diagram remain unchanged. A brief explanation of how pin numbers are assigned to chips/chip sockets and more detailed drawings showing exactly which holes in the Add-Mem board go with which parts would be welcome additions.

Stripping Down

Removing the system board is a fairly straightforward procedure. Be sure to give yourself plenty of room to work and, before opening the system unit, discharge any static electricity you may be carrying. All expansion cards must be removed and should be stored in a safe place. The system board itself is held in place by only two mounting screws and four or five nylon sliding supports. Two connecting plugs from the power supply must be pulled, along with the keyboard connector and the small speaker plug near the front of the unit. The system board then slides out to the left. To minimize chances of damage by static electricity, spread a large sheet of aluminum foil over a soft towel on your workbench for use as a work surface.

If you're unfamiliar with assembly work on components of this type, practice

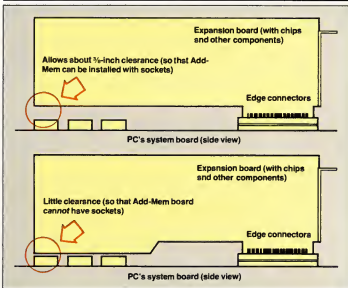


Figure 2: Above, a normal or "high-slung" board. Below, a low-slung board.

on a scrap printed circuit board (easily obtainable from an electronics surplus house) before tackling the real thing.

A few things you'll need to do the job right include a chip puller (less than \$2 at electronics stores), temperature-controlled soldering irons for making the required solder connections (low-wattage irons will do in a pinch), and rosin-core solder (don't use any other type for electronic work). Enough 30-gauge wire is included in the Add-Mem kit to make the few connections necessary to the system board.

Adding On

Soldering the sockets and capacitors to the board is fairly easy, although the poor diagrams make it difficult to tell how to

Should you even attempt to install an Add-Mem board in your 64K PC? If you have some electronic kit-building experience, your chances of successfully upgrading your PC are very good.

orient the chip sockets. I resolved this problem by copying the socket orientation on the IBM system board. Take care that all the pins on the chip sockets go into the holes on the PC board and are not bent under or broken off. (It would have been nice if Add-Mem had included a couple of extra sockets and capacitors in case of accidents, as their cost is nominal.) Some of the pins fit into special pin sockets that come already fitted on the Add-Mem board. I found that cutting these sockets' pins slightly shorter than the others helps keep the sockets level for the final installation.

The instructions for cutting "traces" on the system board are clear and thorough. Double-check to be sure the trace or lead you're about to cut is the right one! An X-acto knife works well for this purpose.

One of the more difficult parts of the installation is cutting and bending pins on a couple of the support chips on the system board. Since most standard diagonal cutters don't have the clearance to reach the

A New BIOS Chip for an Old PC

Several important changes and corrections make trading in your 1981 ROM BIOS chip for a new one a good idea.

What separates a true IBM PC from its so-called clones is the Read Only Memory or ROM. You can find ROM in a row of five integrated circuit chips between the five expansion board sockets and the system RAM on the PC's motherboard. Each of the five ROM chips holds 8K worth of unerasable programs or routines. The code in these chips is proprietary to IBM and consists of two parts. The first four chips contain 32K of BASIC support routines that are used by all three types of PC BASIC, from cassette BASIC to regular disk BASIC and BASICA. The last 8K chip contains the machine language routines referred to as BIOS or Basic Input/Output System, which are the heart of any operating system run on the IBM PC. These routines function like errand boys for any software running on the computer. The ROM subroutines provide a mechanism that allows the CPU to receive input or provide output to the monitor, printer, or whatever else is connected to the computer.

During the past 5 years, IBM has made several changes and corrections to this BIOS. Perhaps the most important change is the ability to boot DOS directly from a hard disk rather than looking for it exclusively on drive A:.

Since the BIOS is permanently stored on a chip, the only way to upgrade a system with an older BIOS is to plug a newer

chip in its place. If you have installed or are planning to install a hard disk for your PC, it's a good idea to make sure you have the most up-to-date BIOS chip. IBM's BIOS upgrade kit, which consists of a new ROM chip, a module puller (or chip removal tool), and an instruction booklet, makes this possible. The kit is available from IBM dealers for \$30 and takes about five minutes to install.

Key Dates

Before rushing out to buy this kit, find out whether your PC needs the upgrade. The BASIC program in Figure A will tell you which version of the BIOS chip is in your PC, so you don't even have to open the cover. Running this program will display the issue date of the BIOS version hidden in your ROM. The earliest date known is "04/24/81," followed by "10/19/81." The second version corrected a couple of minor errors in Version 1.0 but did not include the hard disk boot routines. An up-to-date version must have the date "10/27/82" or later.

If your computer contains one of the 1981 chips and you want to upgrade it, you'll need to contact an authorized IBM dealer in order to purchase an upgrade kit, part number 6137800. However, a Catch-22 is involved: To purchase the upgrade you must trade in your old ROM BIOS chip. Yet pulling the old chip out safely requires the use of a module puller

BIOS ROM DATE LISTING

```

10 DEF SEG=&HFFFF          : ' Set segment address
20 FOR A=&HFFFF TO &HFFFF   : ' Select 6 bytes to read
30 BYTE%=PEEK(A)            : ' Read a byte
40 PRINT CHR$(BYTE%);        : ' Print it to the screen
50 GET nextByte              : ' Get the next byte
60 NEXT                      : ' Done.
```

Figure A: A BASIC program to print the ROM BIOS date.

(IBM's term), which is included in the BIOS upgrade kit.

Installation instructions are provided by IBM in a 38-page pamphlet that's full of diagrams and memory switch settings. The instructions are very clear and tend, if anything, to be a little too conservative. For example, IBM suggests removing *all* expansion boards when installing the replacement ROM BIOS. Actually, just the rightmost card or two may have to be pulled for the chip to be properly installed. Still, it's nice to see the detail that can be included in a seven-page, six-diagram essay on removing the PC's cover and power cords!

Installing the chip itself is an easy task, best done by your own nimble fingers. Do *not* use the module puller to install the BIOS. With a total of 24 pins, this chip is more difficult to install than a standard RAM chip, but not much. The procedure is relatively straightforward. Take the normal precautions against static electricity, make sure each pin gets into the proper hole in the ROM socket, press it home, reinstall any add-on boards you may have removed, replace the cover, and turn on the power.

To check on your installation, boot up the PC and rerun the date-checker program, then welcome yourself to the up-to-date ROM BIOS Club!

—Peter Feldmann

PC FACT FILE

BIOS Kit ROM Module
IBM Part No. 6137800
IBM Corporation
Entry Systems Division
P.O. Box 1328
Boca Raton, FL 33432
(800) 426-3333
List Price: \$30

CIRCLE 649 ON READER SERVICE CARD

proper pins, using one increases the risk of breaking off part of the chip as well as the lead. Cutters with very narrow jaws work best. Once the indicated pins are severed, they are bent upwards and act as terminals for new wire connections.

After the necessary cuts and new connections have been made, you install the Add-Mem board on the system board by plugging the special pins on the underside into the old 16K sockets and connecting four small wires to locations on the system board.

All Systems Go

Instructions are given for both visual and electrical checks of the work. The work must check out before applying power. You must use an ohmmeter to do the electrical check. Again, the instructions show signs of hurried changes, with portions of the checklist scribbled out or modified in some way. I like to believe that these changes indicate the author has read his own manuscript at least twice before unleashing it on the amateur assembler. Most portions of the checklist are quite thorough, if messy.

Once the visual inspection checks out and the ohmmeter shows no shorts in the power supply, it's time to reinstall the system board into the PC, connect the speaker (remember that audio beeps from the speaker are an important part of the power-on diagnostics), and install both the monitor and disk-controller cards. The sockets in the Add-Mem board should be filled with 64-kilobit chips and the keyboard plugged into its socket at the rear of the system board.

Having reassembled the system board and reinstalled the two boards, I hit the big red switch with my heart in my throat. Nothing happened. A quick call to Add-Mem revealed that one of the wire connections had been mislabeled in the instructions. After a little resoldering job and some cleanup work on the bottom side of the motherboard, the PC booted up without a hitch.

A later call to Add-Mem revealed that of users who called with problems, most either found the electrical checklist somewhat confusing or had not completely inserted the Add-Mem Board into the old 16-kilobit sockets on the motherboard. Many

so-called memory errors are caused by poor seating of the memory chips in their sockets. Since the Add-Mem board adds two new interfaces between the actual memory chip and the system board, the possibility for a bad electrical connection is just that much greater. Once a good connection has been established, Add-Mem recommends that you hot-glue the unit to the system board.

Upon reconnecting the defective wire, my PC revealed to its proud owner that 256K RAM was now resident in its memory. I ran several memory-testing programs on the new memory, all with positive results. Most of the diagnostic programs insisted I had 64K on the system board and 192K installed in an add-on card, but this apparently was because of the way that ROM checks the switch settings rather than any problems with the Add-Mem unit itself.

Present-Day Compatibility

Adding a standard 384K multifunction board brought the system total up to the standard maximum of 640K. No problems. I then tried replacing the 384K card with a JRAM 2 memory board loaded with 512K. The resulting 768K of memory was divided up into 320K for DOS, 64K as a print spooler, and 384K as a RAMdisk. After 2 weeks of testing, the system was running well with no malfunctioning memory. An IBM BIOS upgrade kit added hard-disk booting capability, and my 1982 PC emerged beeping into present-day compatibility.

Should you even attempt to install an Add-Mem board in your 64K PC? If you have some electronic kit-building experience and know the difference between a resistor and a capacitor (or if you have access to a friend with such knowledge), your chances of successfully upgrading your PC are very good. If, on the other hand, you've never held a soldering iron and are under the impression that a printed circuit board is some sort of train schedule, you would be much better off sending your system board to Add-Mem to make the upgrade. ■

Peter Feldmann's last piece for PC Magazine was a review of new quad-density disk drives.

The Sanyo 775: Color

If the Compaq is a PC clone, then the Sanyo MBC-775 portable computer is a Compaq clone. With the exception of its color monitor, the unit closely resembles the Compaq in both appearance and performance. It comes with two Chinon half-height 360K disk drives, an eight-inch color monitor with built-in graphics support on its system board, and 256K dynamic RAM. The 8088 CPU runs at a clock rate of 8.0 megahertz per second (8 million cycles per second, as compared to the 4.77-megahertz rate for the standard PC), which equals the Compaq's processor speed. It also has a socket for a 8087 coprocessor chip (for number-crunching applications), jacks in the rear of the unit for either a composite or an external RGB monitor, and a parallel RS-232C socket to support a printer. A serial port would have been more useful than extra monitor outputs; few portable computer users will want to lug an extra monitor around, while many would find support for a modem useful.

A Soft Touch

The Sanyo 775 keyboard is about half the weight of the standard PC keyboard. There's no audible click; the plastic keys have a soft touch similar to the Compaq's keyboard but aren't quite as mushy. Unlike the Compaq, however, you can't adjust the volume of the keystroke response tone, and because the feel of your keyboard is a highly personal matter (I liked the Sanyo's soft touch once I got used to it), this is one aspect of the machine you'll have to evaluate yourself. The Sanyo 775's keyboard cord is about 30 percent longer than the Compaq's, allowing for greater freedom of movement. It has LED indicators on two of the three toggle keys (NumLock and CapsLock) but not on the ScrollLock key. I think this feature is overrated because I often hit keys without looking at the keyboard. Another problem with

The Sanyo MBC-775 is a fast, reasonably priced transportable that resembles a Compaq with something extra: a color monitor. The bad news is you can't upgrade it to a hard disk.

the LED approach is that you can easily (and inadvertently) put the LED indicators 180 degrees out of sync by hitting the NumLock or CapsLock key or by using software that changes the state of the toggle keys.

Sanyo altered the numeric keypad to allow for an extra Enter key in the lower right-hand corner by reducing both the "-" and "+" keys to the size of a standard character key. This makes it rather difficult to use the keypad in its adding machine function unless you have small fingers.

One interesting difference between the Sanyo 775's keyboard and the IBM PC's is the way both handle the Esc key. Pressing the Esc key on both machines causes an ASCII 27 character to be output. However, the screen of the PC displays a backslash (\) on the screen, while the Sanyo 775's screen produces the two characters "[~" (the equivalent of Esc). Neither computer allows you to use this key to send signals to either the screen or printer drivers. However, in the PC, if you press the Esc key after typing in a command string, it will cancel that command (that is, the CPU ignores it); the Sanyo 775 doesn't support this function. (Note: If your unit is equipped with the original ROM BIOS, 1.01, you'll find a bug that causes the

screen to show a "w" instead of a "~" when you use the Shift-Del key combination. However, this has been corrected in ROM BIOS 1.02.)

The Sanyo 775 has an 8-inch color monitor with a 640 by 200 resolution equal to IBM's color monitor. Its colors, as shown on the IBM colorbar program (on the DOS supplementary disk), do not show quite as much difference between the normal and the bright setting as the IBM color monitor, and the brown is rather more a tan than a true brown. The Sanyo 775 has a dot pitch size of .31 mm rather than the standard .41-mm pitch. This smaller dot size, along with the naturally smaller size of characters on the screen, creates the impression of improved legibility. Images in some of the brighter colors have a slight tendency to become fuzzy near the edges of the screen, but this is not usually distracting.

Text readability on the monitor is quite good but not quite up to the high resolution of the PC's monochrome monitor. Setting the screen attributes to show characters in either a green or a yellow color on a black background gives the Sanyo 775 a very useable text-processing screen.

Upgrading Problems

The Sanyo 775 comes equipped with two half-height 360K disk drives, and its front panel is made of a one-piece sheet of heavy-gauge plastic that incorporates the two drives. This fact makes it virtually impossible to replace the drives with any other type of drive—a factor to consider if you think you might want a hard disk operation at a later date. To add a hard disk to this unit, you would have to attack the front panel with a hammer and chisel.

This unit's disk-locking mechanism works differently than those of most floppy drives. You insert a disk and squeeze the lever shut. To remove the disk, you must squeeze the lever again; the disk will

On the Small Screen



SANYO PULLS A FAST ONE: Among the assets of the 775, a luggable modeled on the Compaq, are speed, a color monitor, and a high degree of PC compatibility.

then pop out. Most of the time this technique works well, but some disks (such as ones with loose labels) can stick in the drive and are difficult to remove. I also noticed a slightly larger than usual number of read errors with some disks.

The drives are remarkably quiet. A noisy fan, however, probably required because of the extra heat generated by the color monitor, disturbs the quiet.

When enclosed in its plastic traveling case, the Sanyo 775 resembles a sewing machine. Weighing in at a hefty 10 pounds more than the Compaq's already heavy 28 pounds, the machine is definitely not suitable as a 98-pound weakling's traveling companion. After hauling it for three blocks in downtown Los Angeles, I had serious thoughts about designing a skewed keyboard for those unfortunates who had forgotten to shift carrying arms every 20 steps or so.

To get the Sanyo 775 ready for operation, you unfold two plastic legs from underneath the main cabinet, which lowers to a horizontal position. The power cord and the printer and external monitor sockets lie behind three small rear doors. With the unit plugged in, one of these three doors must remain open because no opening is cut out for the power cord and also because the air input grill is located in the same recess. Unfortunately, the access door adds another 4 inches to the depth of the cabinet when it's in operation, and in many portable computer operating conditions, space is at a premium.

PC FACTS

Sanyo MBC-775
Sanyo Electric Co., Ltd.
51 Joseph St.
Moonachie, NJ 07074
(201) 440-9300

List Price: \$2,599

CIRCLE 698 ON READER SERVICE CARD

The keyboard is held to the front panel by two plastic levers that unfold to provide support legs in a manner similar to the PC's. Sanyo made it easy for you to reach the power switch, the monitor brightness control, and the two vertically mounted disk drives, which are all on the front panel; you don't need to grope for the big red switch at the rear of the unit.

The Sanyo 775 hums to life very quickly once you push the switch: it takes only about 8 seconds, including disk access and monitor warm-up time. "Hums" is perhaps poetic license here because the cooling fan has a very annoying whine. I tended to block out the sound after 15 to 20 minutes of use but always felt relieved when I turned the unit off. The short power-on sequence means that very little in the way of a power-on self-test is done in a normal boot-up. You can power the unit with an unplugged keyboard with no sign of agitation from the monitor or speaker. If problems occur, you'll have to borrow an IBM diagnostics disk and manual because Sanyo doesn't supply them. If you boot up the unit with drive A: open or empty, the screen displays the ROM BIOS release number and apparently tries an infinite number of disk reads: the LED for drive A: goes on and stays on. The Sanyo 775 has no cassette BASIC installed but does supply all the BASIC routines on the disk in an .EXE file (standard for machines running MS-DOS rather than DOS).

Documentation

The Sanyo MBC-775 comes with MS-DOS 2.11 and GW-BASIC 2.02, along with an IBM-size loose-leaf binder containing the user's guide. This 150-page guide is supplied in lieu of IBM's Guide to Operations, BASIC manual, DOS man-

The average I/O of a PC increases by 377 percent when you use a RAMdisk. The Sanyo whizzes along at an even greater clip: more than five times as fast as when writing to a floppy disk.

ual, and Technical Reference manual. The company shoehorns a fairly extensive amount of information into the guide, but space considerations obviously limit the extent and the completeness of the explanations. Among other items, the guide includes a list of BASIC and MS-DOS commands, BASIC error messages, a very brief DOS technical reference section showing some interrupt calls, pinouts for the Sanyo 775 connectors, and a 13-page computer vocabulary section.

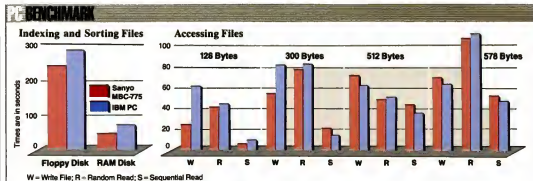
Three other loose-leaf manuals and several disks contain software packages that

are bundled with the Sanyo 775 from the IUS Corporation, including *EasyWriter II* and *EasyMailer II* (word processing), *EasyPlanner* (spreadsheet), and *EasyFiler* (database).

PC Compatibility

In any PC clone the ability to run software designed for the PC without modification must take precedence over everything else. Fortunately, the Sanyo 775 bears no resemblance to its predecessor, the MBC-555, in this regard (see "Lifting the Veil of Compatibility," *PC*, Volume 3 Number 6). Many hardware and software factors affect PC compatibility, and some are very subtle. Probably the single most important factor affecting programs that could not run on the Sanyo was the 1.7-fold increase in the clock rate, or computing speed. Most users would automatically opt for the faster computer if given a choice, but some software depends on a predetermined clock rate and if that speed is changed, the software cannot run or runs improperly. Other PC clones with fast clock rates have switches to slow microprocessor speed down to the PC's level if required. The Sanyo 775 does not have this capability at the present, but the company anticipates such a modification by the time this article is published.

Almost all the commercial programs tested on the Sanyo ran with no apparent problems, including *WordStar 3.3*,



Figures 1 and 2: We subjected the Sanyo MBC-775 to the standard PC Magazine benchmarks, and it stole the show. Figure 1, left, shows the results of a dBASE II indexing and sorting test for I/O speed, performed on a 300-name mailing list. The Sanyo beat the PC by about 20 seconds on the floppy disk and RAMdisk tests. In Figure 2, right, the file access tasks tested the Sanyo's Chinon floppy drives against the IBM PC's standard Tandon drives. The Sanyo did best with the smallest file and had some trouble with the larger one. In no case, however, did the IBM PC leave it far behind.



26 reasons to subscribe to PC Magazine

You'll get 26 big issues a year of the most up-to-date news and technological breakthroughs affecting you and how you use your IBM PC—at unbelievable savings!

You'll build a professional library of insights, written by leading experts and professionals in personal computing covering the newest releases in hardware and peripherals—timely innovations in programming and applications—feedback from professionals and users like yourself on how they use their PCs to increase their productivity—and up-to-the-minute reviews of the newest releases in software.

Subscribe to *PC Magazine* for less than 85¢ an issue, only \$21.97 for 26 issues and save 37% off the regular one-year rate.

Use the attached Order Card or call Toll Free

1-800-852-5200



MAKE THE CONNECTION . . .

Our Connection systems will solve your problem of trying to read and write diskettes or tapes from almost any computer system using your PC.

The Diskette Connection is a hardware system that enables the IBM PC or compatible to read and write most 8 inch, 5¼ inch, or 3½ inch diskettes.

With our File Connection software programs you can transfer data files between most computer systems, including CP/M, DEC, Honeywell, Univac, IBM 3740, S/1, S/3, S/23, S/32, S/34, S/36, and S/38.

Our Word and Typesetting Connection programs use IBM standard Document Content Architecture (DCA-RFT) to transfer document files between most word processing and typesetting systems, including Compugraphic MCS, CPT, Displaywriter, OS/6, Multiset, NBI, Quadex, Xerox, and Wang.

Our Tape Connection system will read and write IBM or ANSI standard ½ inch 1600 BPI magnetic tape. A full size 2400 foot tape can store a 45 MByte file and be written in 6 minutes.

Since 1982, we have supplied thousands of systems to customers around the world, including IBM, NASA, AT&T, Kodak, and General Motors.

Our specialty is conversion systems and we can provide a solution to your problem. Call us today to discuss your requirements.

This ad is one of a series featuring NASA missions. For a free poster, send us your written request.

Box 1970 Flagstaff, AZ 86002
(602) 774-5187 Telex 705609

CIRCLE 177 ON READER SERVICE CARD

. . . FLAGSTAFF ENGINEERING

Volkswriter Deluxe, Spellbinder, XY-Write II-Plus, and IBM Personal Editor.

When I ran dBASE II, indexing and sorting times on the Sanyo showed a definite increase in speed over the PC. I ran a simple benchmarking program called DEXTTEST on both machines that indexed a 300-name mailing list through three iterations. To investigate the role of diskette I/O as a factor in overall performance, I ran the benchmark both from a floppy disk and from a RAMdisk. I performed a RAMdisk bench test to minimize the effect that diskette I/O (the writing and reading of information to and from a floppy disk) had on the timing results.

Figure 1 shows that the 775 is indeed faster at CPU-intensive chores like indexing and sorting. If you can store everything in RAM so that the effect of disk I/O is minimized, the Sanyo runs 48 percent faster than the PC in indexing the 300-name mailing list. Note that if you run the program from a floppy drive, the disk reading and writing times minimize the CPU speed differential between the two machines, and the Sanyo is only 10 percent faster than its cousin from Big Blue, even though the Sanyo 775's microprocessor zips along at 1.7 times the rate of the PC's.

The I/O factor from Figure 1 shows how much the burden of interfacing with a physical object, such as a disk drive, is on a computer's electronic gymnastics. The average I/O speed of a PC increases by 377 percent when you use a RAMdisk. The Sanyo whizzes along at an even greater clip: more than five times as fast as when writing to a floppy disk.

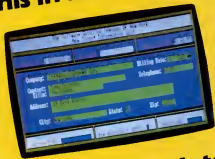
I also ran a disk I/O benchmark on the Sanyo. The results, when compared to those given by an IBM PC with standard Tandon TM-100-2 drives, were rather confusing. For straight disk I/O, I had expected the Sanyo's Chinon drives to be just slightly slower than the Tandons. Yet when I ran benchmarks for writing and then reading 128-byte files, the Sanyo's drives tested more than twice as fast. Running the same test with 512-byte files gave results similar to those I had expected: the Chinons were about 15 percent slower when writing the files (see Figure 2). (For an explanation of how the "read/write" test was done, see *PC Magazine*, Volume 4 Number 10, page 113.)

Other Programs

dBASE III and Framework seemed to run perfectly, but the Sanyo's 256K RAM allowed little room to run many programs. 1-2-3 ran without problems, but, once

again, the memory limit kept me from loading large spreadsheets. I also tested a test device driver for a RAMdisk (I used VDSIK.SYS from IBM's DOS 3.0, and it worked perfectly).

Create screens like this in minutes . . .



and Screen Sculptor writes the program!

In Basic and Turbo Pascal

It's that easy! The entire Screen Sculptor package generates programs in IBM Basic, Turbo Pascal, and IBM Pascal.

Now, anyone can have attractive, intelligent input screens and sophisticated data entry routines in minutes.

Move pieces of the screen around, select colors from a menu, draw lines and boxes, point, repeat last character in any direction.

And more!—Specify variable names, data types, acceptable data ranges, pictures for edit checking, etc.

Screen Sculptor then generates actual program source code based on your screen design. Use it as is or modify it.

And it's only \$125

Requires an IBM PC, XT, PCjr, PC AT or 100% compatible, 128K, DOS, one 320K disk drive and any 80 column display.



"GREAT PRODUCT! GREAT VALUE!"
C. Schmidt, PC Bytes Guide

Here's a no-risk offer. Order now and you'll also get a full demo disk. Use the demo and the material for 30 days. If you don't love it, return the package for a full refund!

All other orders and separate call or write. Software by Screen Co., 6600 L.I. Express, Maspeth, NY 11378
718-458-9700.

NO RISK DEMO OFFER!

Credit card orders call operator 268
(800) 824-7888



THE SOFTWARE
BOTTLING
COMPANY
OF NEW YORK

To check the Sanyo 775 from a programmer's point of view, I tried three different compilers: the Microsoft BASIC Compiler 1.0, the IBM Pascal Compiler 1.0, and Turbo Pascal 3.01. The interest-

ing point about these compilers is not that they were incompatible (indeed, they all worked very well and reflected the speed of the Sanyo 775) but that Sanyo's release of MS-DOS 2.11 did not include a linker

program, such as LINK.EXE familiar to all DOS users. IBM Pascal 2.0 contains a version of LINK, but Version 1.0 did not. Presumably, then, you would have to purchase a separate copy of DOS to do serious programming on the Sanyo 775. Turbo Pascal, which produces .COM files as a final result, does not require (and cannot use) LINK.EXE.

Lattice® Products Are Your Best Investment

Lattice TopView Tool- \$250.00
basket—Provides more than 70 functions that eliminate the need for extensive use of assembly language when interfacing with TopView. Includes functions to control window, cursor, pointer, and printer operations. Also provides access to cut-and-paste facility and debugging services.

LINK™—Automated \$195.00
product generation utility for MS-DOS, similar to UNIX "Make"

C-Sprite™—Symbolic \$175.00
debugger for programs written in Lattice C or assembly language

C Compilers—MS-DOS \$500.00
and PC-DOS—The industry standard

Panel—High performance \$295.00
screen design and screen management system. Available for MS-DOS, PC-DOS, and UNIX systems

dbc II™ or dbc III™— \$250.00
C function libraries supporting indexed files that are compatible with dBASE II® or dBASE III™

C-Food Smorgasbord™ \$150.00
—Includes a BCD decimal arithmetic package, I/O functions, IBM-PC BIOS interface, terminal independence package, plus many other utility functions

Text Management Utili- \$120.00
ties—[GREP/DIFF/ED/WC/EXTRACT/BUILD]—Essential programming and documentation aids in any environment

With Lattice published products you get "Lattice Service" including telephone support, free updates during the warranty period, notice of new products and enhancements when you register, and a money-back guarantee. Corporate site license agreements are available.

Call us today for further information on these, or our many other C programs, utilities, and tools!



Lattice, Inc.
P.O. Box 3072
Glen Ellyn, IL 60138
Phone (312) 858-7950
TWX 910-291-2190

We practice portability International Sales Offices

Benelux: De Vooght, Phone (32)-2-720.91.28.
England: Roundhill, Phone: (0672) 54675
Japan: Lifeboat Inc. Phone: (03) 293-4711

A Competitive Price

If you enjoy using a color monitor and don't mind the absence of a hard disk, the Sanyo 775 is a worthwhile entry in the portable/compatible market. Its list price certainly makes it competitive with the Compaq, but its inability to be upgraded later for a hard disk is a definite liability. Portability, after all, means that you should be able to easily relocate the unit from one location to another. Having to pack an additional carton of disks along with a rather heavy computer makes things a little difficult.

Upgrading the unit with additional memory is also a problem because the system's color monitor makes rather heavy demands on its power supply. Sanyo's marketing manager, Sandy Waters, claims that only two multifunction boards presently available are conservative enough in their consumption of power to be used in the Sanyo 775. The unit is equipped with two expansion slots for additional functions. Most portable users will probably want to install a modem for communications with their fixed unit back at the office, but the limited availability of internal power and the extra heat generated by the color monitor may cause problems. You might be able to add a multifunction board with a serial port for communications, but then you would also have to cart the external modem, its power supply, and cables along with the Sanyo 775.

Waters indicates that Sanyo plans to release a version of its portable with a 20-megabyte hard disk in the near future at an estimated list price of \$3,899. With the hard disk and with power problems solved, the Sanyo 775 will be a good choice in what could be called the "heavy-weight" portable field. ■

Peter Feldmann writes regularly for PC Magazine.

THE MOST POWERFUL, MOST
COMPLETE dBASE PROGRAM
DEVELOPMENT TOOL EVER!

FLASH CODE™

Program Developer
for **dBASE II & dBASE III**

INTRODUCTORY
PRICE
\$150.

Actually "DRAW" your dBASE screens!

Take full advantage of all special characters, draw boxes and lines, use the color select menu, move pieces of the screen around, and more!

Specify variable names, file variables, data types, acceptable data ranges, pictures for edit checking, initial values, calculated fields, indexes, and more in a flash!

FLASH Code writes your program in either dBASE II or dBASE III!

Use it as is, modify it, or merge it with your own code. You can even use our new FLASHUP module to instantly flash up even the most complicated screen designs. No more waiting for slow print statements to display your screens.



POP-UP Windows

Create pop-up menus and pop-up help screens with our window editor. Use the FLASHUP module and have them pop up all over your dBASE applications.

NO RISK DEMO OFFER! TRY IT—YOU'LL USE IT!

Here's a no-risk offer. Order now and you'll also get a full demo disk. Use the demo and the manual for 30 days. If you don't love it, return the package for a full refund!



THE
**SOFTWARE
BOTTLING
COMPANY**
OF NEW YORK

Credit card orders only call 24 hours a day, 1-800-824-7888, operator 268.
For all other orders and inquiries call or write: The Software Bottling Company of New York, 6600 L.I. Expwy, Maspeth, NY 11378,
(718) 458-3700. If we're shipping to a NYS address, please add 8 1/2% sales tax.

High Fidelity



Why high fidelity boards feed your IBM better data. Longer.

On a turntable, high fidelity means no hiss, no static, no noise.

It means the same in a computer.

No noise is good noise. Your IBM "reads" data as a series of ones and zeros. But with some expansion boards, you get small amounts of radio frequency interference—noise—that can make a one look like a zero. Or vice versa.

That's called data error.

And if it happens in column 27 of your spreadsheet, the result can be disastrous.

Silent partner.

On a Computer Peripherals High Fidelity Board, we've used wider traces to carry the signal. So there's less noise. And a multi-layer construction makes our boards run cooler and last longer. No noise and no heat mean no data error.

Worth finding.

Computer Peripherals High Fidelity Boards are available as memory expansion up to 512K, multi-function and other configurations for IBM personal computers.

If you value your data, a Computer Peripherals board is worth finding. Call (800) 854-7600 and find out where.

**computer
peripherals**
High Fidelity Computer Components

2635 Lavery Court #5
Newbury Park, California 91320
(800) 854-7600 • In California, (818) 710-1717

CIRCLE 374 ON READER SERVICE CARD



Borland's SuperKey offers ProKey compatibility—and such handy features of its own as data encryption and cut-and-paste—at nearly half ProKey's price.

Can SuperKey Soup Up Your Macros?

The chefs at Borland International have a recipe for software stardom: Mix lots of power into an easy-to-use program and garnish with a low, low price tag. They used this recipe to produce Borland's successful Turbo Pascal and SideKick, and they're trying it a third time with *SuperKey*, a feature-packed keyboard utility that undersells its main competitor, RoseSoft's *ProKey*, by almost 50 percent.

A keyboard utility sits in your PC's memory, inert and invisible, until you want it to go to work. You press a key and it comes to life, allowing you to redefine your keys by creating macros. A macro isn't limited to text; it can include program commands and fill-in-the-blank spaces that let you create your own customized versions of applications programs. You could use a keyboard utility, for instance,

to create your own menu-driven shell for DOS, so that computer novices in your office can copy files and find their way around the DOS subdirectories.

ProKey is the preeminent keyboard utility for the PC, and Borland acknowledged that fact by designing *SuperKey* as a *ProKey* compatible (see "A Key Match-up: ProKey vs. SuperKey," *PC*, Volume 4 Number 15, p. 37). It uses many of the same commands, and with a few exceptions, it can use *ProKey* macro files.

But *SuperKey* is much more than a *ProKey* clone. If you love software gadgetry, this is the program for you. It has enough doodads to keep you experimenting for days. And a lot of them are even useful.

A Distinctive Difference

The bedrock of *SuperKey* is that it does almost everything *ProKey* can do, although its flavor is subtly different. Of

course, you'll find an interactive macro recording that uses *ProKey* commands, fill-in-the-blank pauses, a one-finger mode for handicapped users, and macros that can invoke or define other macros. But on top of this foundation, *SuperKey* has built its own superstructure. You can get to all the program's features through lightning-fast pull-down menus that appear at a keystroke and then abruptly disappear when dismissed (see Figure 1). For many features you can also use *ProKey*-like commands for even quicker response. Using the menus takes more keystrokes, but you're less likely to get lost. And if you do run into trouble while you're using the menus, you can summon *SuperKey*'s context-sensitive help messages.

The menus are also the gateway to the features that are unique to *SuperKey*. *SuperKey* has a pop-up macro editor and lots of new macro functions, as well as some

goodies that have nothing to do with macros. The pop-up macro editor is an editing screen that lets you record keystrokes without passing the values through to your applications program. The editor also lets you change existing macros. You can think of it as a specialized kind of word processor with which you edit macros instead of text. It's especially handy for adding macro titles, descriptive headings that show up in *SuperKey's* pop-up macro dictionary, which lists the macros currently in memory.

The menu also lets you manage *SuperKey* macro files: You can clear your macros from memory, write them to disk, or load a new macro file without ever leaving your applications program. And it gives you access to a bountiful array of functions that you can build into your macros.

Are you always forgetting your current disk drive or directory? Create a macro with *SuperKey's* disk drive and directory functions that bring back the answer for you. Do you need a time and date stamp for your phone log? Use *SuperKey's* time and date functions that pull the information from your system's clock. Are you afraid someone will look over your shoulder while you're working with sensitive data (or, perhaps, playing with *Flight Simulator*)? A *SuperKey* macro can instantly blank your screen, while another one can turn it back on again. Are you worried a mischievous co-worker might mess with your spreadsheet while you're visiting the water cooler? You can use a *SuperKey* macro to lock your keyboard with a pass-

word. You can even make your macros sing with *SuperKey's* beep function that lets you operate the PC's speaker.

My favorite *SuperKey* feature is the display macro, a window of text that you can create yourself and summon at a keystroke. For instance, you could set up a help screen for your own menu-driven version of DOS (see Figure 2). Like *SuperKey's* own menus, the display macros jump instantly onto the screen and then pop out of sight when you press Esc.

You have to use a text-editing program to create the display macro; *SuperKey's* built-in macro editor won't work. It's a fairly simple procedure, clearly explained in the manual. You begin by typing in some numbers to tell *SuperKey* how large your window will be and its position on the screen. If your text overflows the window, *SuperKey* will let you scroll using the PgUp and PgDn keys. After you store the text on disk, you tell *SuperKey* to load the display macro into the main memory; it will be accessible at a keystroke.

If you want your display macro to appear automatically when you load your application, you can create a set of "auto-start" macros that execute as soon as they come into memory. To get your application loaded before the display macro appears, you have to "chain" the autostart macros: one loads your application and then the autostart display macro. You might have to fiddle a bit to get the sequence right because the manual doesn't offer a comprehensive example.

Another innovative *SuperKey* feature is

its data entry control. Like some database programs that let you restrict data fields to certain characters or numbers, *SuperKey* lets you specify the kind of data that the keyboard operator can enter into the blanks in your macros. For instance, a macro could prompt for a zip code and then accept only numbers from the keyboard. You can also specify letters only—uppercase, lowercase or mixed. If you choose a case option, *SuperKey* will automatically convert any alphabetic input to the proper case. For numbers, *SuperKey* lets you create a format mask that will automatically add commas and decimal points.

SuperKey has many more software gadgets. It has a cut-and-paste feature that allows you to lift information from your screen and put it in a macro. This is a quick way to transfer a few columns of numbers from your spreadsheet to your word processing program. *SuperKey* also offers a DOS command stack that lets you browse through your last 10 to 15 DOS commands and reexecute the command of your choice with a single keystroke. For spreadsheet



SuperKey

Borland International
4113 Scotts Valley Dr.
Scotts Valley, CA 95066
(408) 438-8400
List Price: \$69.95

Requires: 55K RAM above memory
needed for applications; one disk drive.

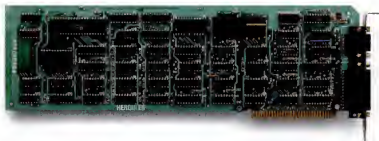
CIRCLE 658 ON READER SERVICE CARD



Figure 1: *SuperKey's* fast pull-down menus appear at the touch of a key. Faster yet are the ProKey-like expert commands.



Figure 2: With *SuperKey* you can create a menu-driven shell for DOS that assigns DOS tasks to the PC's function keys.



The world's best selling monochrome graphics card for the IBM PC.

There are more Hercules® Graphics Cards in more IBM® PCs, XT's and AT's than any other monochrome graphics card in the world.

Over a quarter of a million demanding users around the world use a Hercules Graphics Card to improve the performance of their software.

The Lotus® 1-2-3® Booster.

Consider Lotus 1-2-3.

Hercules gives an off-the-shelf copy of 1-2-3 the highest resolution possible on an IBM



PC, XT or AT. More 1-2-3 users choose the Hercules Graphics Card to get crisper text and sharper graphics than any other monochrome graphics card.

And we bring the same performance to other integrated programs like Symphony®, Framework®, and SuperCalc®3.

But we don't stop there. The Hercules Graphics Card

improves all kinds of software.

Like Microsoft® Word, a word processor that enables you to display text with subscripts, superscripts and italics.

Or pfs: Graph, an easy-to-use business graphics program that converts your data into presentation quality graphs.

Or Microsoft® Flight Simulator, the high flying game for the overworked executive.

Or our own Graph X®, a library of graphics sub-routines that eases graphics programming.

Or AutoCAD®, a computer aided design program that offers features normally associated with expensive CAD systems.

And we supply free software with each card to do hi-res graphics using the PC's BASIC interpreter.



State-Of-The-Art Hardware.

The Hercules Graphics Card gives you graphics resolution of 720h x 348v and a

parallel printer port. Our unique static RAM buffer provides sharp 9 x 14 characters and flicker-free scrolling. Our exclusive safety features help



prevent damage to your monitor.

State-of-the-art custom IC technology delivers unsurpassed reliability. Ordinary graphics cards use up to 30 ICs to do what one Hercules IC does. By using fewer parts, we reduce the possibility of component failure.

Which is one reason we warranty the Hercules Graphics Card for two years.

Unbeatable reliability. Advanced technology. Proven by over a quarter of a million users. Why settle for anything less than Hercules?

Call 1-800-532-0600 Ext 400 for the name of a Hercules dealer nearest you and we'll rush you our free info kit.

Hercules.
We're strong on graphics.

FAST DELIVERY
COAST TO COAST
AIR EXPRESS RUSH



TOLL FREE ORDERS ONLY! 800-631-0962
(INSIDE CALIFORNIA) 800-521-6162

GUARANTEED LOWEST PRICES!

OUR PRICE GUARANTEE -
It's Simple! We'll beat any ad in
this magazine - same terms -
call TOLL FREE for details!

DCC WILL BEAT
ANY PRICE
IN THIS MAGAZINE

Customer Service
HOTLINE
(408) 374-4903

OUR CUSTOMER SATISFACTION GUARANTEE: If for any reason your DCC purchase fails to meet manufacturer's specifications within 30 days of purchase, please return it to us for a full refund or exchange of your choice. Sorry, software excluded due to copyright laws.

EPSON See list below.
NEW 1100 and 1100S
also NEW 7300
(color)
ALL MODELS REDUCED
also 2410 (2500 cap)
OKIDATA

IBM PC \$1575 2 drvs 256K
10 mg hard disk
\$2150
IBM XT \$2795
256K, 1-360K drive only

new models!!
HR-15 XL \$349
BROTHER
"LETTER QUALITY"
\$699 - High Speed 36 cps
- 7K Buffer **HR-35**

COMPUTERS

IBM PC & XT See special advert
PC with 1 drive only 499
PC with 2 drives 599
XT with 10 mg HD 1200
XT with 2 drives 1500
Dell for details - Compatible brands
Dell's Keyboards/Screening Edge

MONITORS

IBM MONOCHROME 249
COLOR 349
AMBER 3000 249
300A 249
300B 249
COLOR 800 419
COLOR 1200 NEW 519
TALAN 17" Green 114
12" Amber 114
400 RGB 114
PRINCETON HS-12 649
HS-12 649
ZENITH 120 - 12" G 159
10" 159
124 MONO - IBM 159
135 RGB COMP 379
POLD 16 COLOR RGB 349

MODEMS

HAYES 300 199
1200 349
1200 IBM INTERNAL 349
MICROCOM II E 249
ANCHOR MAIL 20 349

PRINTERS

DOT MATRIX
EPSON RX 100 only 299
L300 100 cps new 249
82 100 cps 132 dot best price
PT 80 or 20 best price
FX 100 100 cps 132 dot 49
L3 1000 200 cps NEW 499
OKIDATA 80A-800A 499
100 New 499
100 New 499
2410 Dramatically Reduced!!

GENIE 10-2 229
STAR MACHINE 8010 249
JUNI 8000 279
JUNI 8000 299

"DAVEY WHEEL"
PRINTER 1 90 cps BERNARD 1199
W/Out Base Encoder 1499
HS-12 649
BROTHER DAVEY WHEEL 399
HS-12 649
JUNI 8000 279
JUNI 8000 299
DANIEL 600 329
JUNI 8000 279
JUNI 8000 299
EYALX 05-15 349
MEC all models 349
GUME all models 349

DRIVES

IBM 360 KB 199
TANDON 100-2 300KB 199
APPLE DRIVES Sale 129

TEAC H-360 KB 119
SHOGUN H-360 KB 119
COSQ 15 MG H.D. W. CONTR. 499
20 MG HARD DISK 449



DISKETTES
SS/DD & DS/DD
79¢ each
"1 YR. Guarantee"



IBM - BOARDS

HERCULES GRAPHICS 309
HERCULES COLOR 149
AST 32 Pin W. BAK 249
MEGALUX 249
STE GRAPHICS PLUS 329
EVERETT GRAPHIC EDGE 179
H.S. CONTROLLER 299
MAGIC CARD 199
QUADRAM GRAPHICARD W. BAK 249
QUADRAM 249
IBM MONOCHROME 249
COLOR GRAPHICS 249
PLANITRONICS COLOR PLUS 379
TECHNAR GRAPHICS MASTER 379
PARADISE COLOR 379

IBM ACCESSORIES

RAM 32K 199
256K CRIPS 199
VERBATIM 5.25 199
ETASAM 5.25 249
KEYTRONICS 511 114
JESTICK KEY/PRINT 499
PRINTER SWITCH BOX 80
COMPARISON SHEET 499
B/I POWER DIRECTORS 499

IBM SOFTWARE

SPREADSHEET
FRAMEWORK Monthly Special 299
MANAGER YOUR MONEY 199
SUPRACAL 3 199
MULTIPAN 129

"IBM WORDPROCESSORS"

WORD PERFECT 249
PFS WRITE 249
MULTIMATE 249
WORD W. MOUSE 249
VOLKSWRITER DELUXE 139
PFS PROOF 139
"IBM DATA BASE"
DBASE II 249
DBASE III 249
PFS FILE 34
CONCORD II 349
S-BASE 4000/5000 279
B-BASE CLOUT 129
"IBM MISC."
BASIC ACT PLUS 349
SP SERIAL ACT 349
BELLARE & BENSE 189
NEWARD TAX PREP 189
SCIENCE 34
COPY II PC 29
THINK 129
PROKEY 32
HARRARD REPORT MGR 249
WORD PERFECT ACT 49
WORTON UTILITIES 49
PFS REPORT 279
DOK JONES ANALYST 279
SET PA 47
"IBM GAMES"
FLIGHT SIMULATOR 34
PINBALL 34
INTELLASTER 34
PROGGER 34
ULTIMA II 34
ZAXON 34
GATO SUD SIMULATOR 34

HUNDREDS OF ITEMS
IN STOCK - CALL!!

O.E.M. SPEC IBM DRIVES

\$99

AST \$229
SIX PAK PLUS
W/64K
RAM **\$249**

20 MG
\$849
HARD DISK
SPECIAL 10 MG
\$545 w/Cable controller

WORDSTAR
All new easy-to-use
Windows
Footnotes
Spell Checks
Much, much more
\$259

\$124 Mouse systems
2-button
w/PC PAINT
MOUSE
3-button
version only **\$140**

DCC DISCOUNT COMPUTER CENTERS

an established mail order/retail distribution network

BUYER FRIENDLY TERMS! • DELIVERY We ship immediately! Most orders delivered within 5 days! Add 3% (5% min) for UPS shipping, handling, insurance. Calif. residents add 7.0% sales tax 2% daily UPS available at extra charge. • PAYMENT Visa, M.C. cashiers checks, money orders, personal checks acceptable. (Allow 10 business days for personal company checks to clear). • WE NEVER CHARGE EXTRA FOR CREDIT CARD C.O.D. or wire (20% a deposit with cash, certified check or money order). • WARRANTY All items shipped are new, include FACTORY WARRANTY and are GUARANTEED TO WORK. DCC is an AUTHORIZED DEALER and SERVICE CENTER for most major brands. • RETURNS Must be accompanied by RMA number (supplied by DEALER) and may be subject to a 20% restocking fee. Prices and availability subject to change without notice. All items limited to stock on hand. • MAIL ORDER PRICES NOT VALID AT RETAIL OUTLETS DUE TO REGIONAL PRICING RESTRICTIONS. Minimum order \$50.

Mail Checks, P.O.'s and Inquiries to:
DCC MAIL ORDER MANAGER
550 DIVISION ST.
CAMPBELL, CA 95008

1707 S. BASCOM AVE. • CAMPBELL, CA 95008 • (408) 559-6555
717 E. EL CAMINO • SUNNYVALE, CA 94087 • (408) 773-8821
1341 FULTON AVE. • SACRAMENTO, CA 95825 • (916) 971-3503

VISIT OUR DISCOUNT SHOWROOMS!

CIRCLE 117 ON READER SERVICE CARD

users the program has a set of alternate cursor keys (you can use the program's default keys or assign defaults of your own) that you can activate whenever you press the NumLock key. To guard against phosphor burn in, *SuperKey* will also temporarily blank your screen if you quit typing for a specified time. And it expands the PC's type-ahead buffer from 15 characters to a generous 128, so you'll never again hear that warning squeak that chides you for getting off your software.

Bonus Features

SideKick users get a bonus: *SuperKey* macros can call up *SideKick* features. You could, for instance, create a macro that would call up your *SideKick* calendar with a single keystroke or set up an automatic computer-use log that runs whenever you turn on your PC. (The latter option works only with the latest version of *SideKick*, and if you try it with an earlier version, you will get an on-screen commercial advising you to send \$24.95 plus your old *SideKick*

disk to Borland for an upgrade.)

There's more. *SuperKey* offers data encryption; you can send your sensitive data across the phone lines without fear of snoopers or keep your on-disk files safe from prying eyes. *SuperKey* encrypts your data using a password that you supply. The right password is crucial to successful decoding, and the *SuperKey* manual warns you that Borland can't help you retrieve your lost data if you forget your password.

SuperKey offers two encryption meth-

A Low-Budget Macro Handler

Newkey may not offer ProKey's and SuperKey's fancy features, but it does a good job of covering the basics.

If you're curious about such keyboard utilities as *SuperKey* and *ProKey* but you're not ready to shell out the required cash, you might want to check out FAB Software's *Newkey*.

Newkey is part of the growing family of user-supported programs that you can get for free (or almost for free) with payment to the author strictly on the honor system. You can get a copy of *Newkey* from a friend, a computer club, an electronic bulletin board, or directly from the author, Frank Bell. For \$10 Bell will ship you an evaluation disk containing the text of an abbreviated manual, a *Newkey* tutorial, and a fully operational *Newkey* program. For the full \$19.95 price, Bell will throw in a 54-page printed manual and agree to answer your questions by phone or mail.

Good and Cheap

Bell wrote *Newkey* in 1983 after reading a review of RoseSoft's *ProKey* and deciding he could produce something similar for a lower price. Since he began marketing *Newkey* in the spring of 1984, he's sold some 270 copies.

While *Newkey* doesn't have all the bells and whistles of *SuperKey* and *ProKey 4.0*, it covers the basics of handling keyboard macros well. As does *SuperKey*, *Newkey* owes a large debt to *ProKey*. Its commands are very similar to *ProKey*'s, and its macro files are almost

completely interchangeable with *ProKey*'s. It offers fill-in-the-blank macros that will pause for keyboard input as well as interactive recording of macros. *Newkey* macros can invoke other macros that you create, up to eight levels deep. It includes some handy macro tools, like timed pauses, and slowdown of macro playback to help macros work with the finicky programs that don't like their keyboard input too fast. It can invoke macros from a batch file. It even has a pop-up help screen that will list the macros currently in residing memory and let you change some program defaults.

Just the Basics

Some of the macro-handling features available in *ProKey* and *SuperKey* are missing from *Newkey*. *Newkey* doesn't have a pop-up macro editor. It doesn't let you use one macro to define another, which is handy in automating long program control sequences for someone less skilled in using the PC. Like older versions of *ProKey*, *Newkey* will read and write macro files from the DOS prompt only. It doesn't offer file management from within an applications program.

All the same, if you don't need these extras, *Newkey* might fit your needs just fine. I tested it with *WordStar 3.3*, *Multiplan*, *SideKick*, *PC-File*, and *Volkswriter Deluxe* and found no major incompatibilities. I did encounter a prob-

lem using *Newkey* with *Microsoft Word* running in its graphics mode. When I tried to use *Newkey*'s pop-up help screen, it sent the *Word* text away to never-never land. However, you can avoid this problem by refraining from using the pop-up help screen with *Word*.

Newkey comes in two versions. If your PC has plenty of RAM, you'll want to use the full-power version that consumes 14K RAM for the program, plus a macro-storage buffer that can range from 10K to 64K bytes, depending on the space you need for your macros. If your PC is short on RAM, you can use the small version of *Newkey* that needs only 5K RAM plus the macro buffer.

Trying out *Newkey* with your own software costs next to nothing, so you should get a copy and take it for a spin. Frank Bell will be happy to hear from you if you decide you like it.

—Dara Pearlman

PC FACT FILE

Newkey 2.3

FAB Software

P.O. Box 336

Wayland, MA 01778

List Price: \$19.95

Requires: 14K RAM (5K RAM for simple version), above memory needed for applications, one disk drive.

CIRCLE 657 ON READER SERVICE CARD

ods. The manual describes Borland's own scheme as fast and "safe against all but the most sophisticated intruders." For even greater security you can choose DES encryption, which follows the Data Encryption Standard issued by the National Bureau of Standards. This method, though safer, is slower. On my test file, DES en-

ryption took four times longer than the Borland method. Albert Holt, director of technical support at Borland, says *SuperKey* offers the first software implementation of DES encryption. For government offices and others who need DES encryption, this feature alone would justify the purchase of *SuperKey*, Holt believes.

Poor Documentation

While Borland packs a lot of value into this \$69.95 keyboard utility, *SuperKey* is not without flaws. My main complaint is the program's manual. The paperbound volume is readable and fairly well indexed, but the explanations are often too scant. The section describing *SuperKey's*

The Best Gets Better

ProKey offers new features to meet *SuperKey's* challenge.

It's dangerous at the top. True, you've got the market share and the money, but you also make a great target for the guys with the peashooters down below.

Borland International has taken aim straight at RoseSoft's *ProKey*, the leading keyboard utility in the PC marketplace, both by making *SuperKey* compatible with *ProKey* and by its aggressive advertising.

But RoseSoft isn't turning the other cheek. Its newest version of *ProKey*, released within days of *SuperKey's* debut, meets its new competitor on many fronts. *SuperKey* boasts a pop-up macro editor. Well so does *ProKey 4.0*. Menus are currently all the rage and now *ProKey* also has them. Do you long for the chance to read and write macro files without leaving your applications program, or a pop-up directory of the macros currently in memory, or the ability to use macros with *Microsoft Word*? Move over *SuperKey*—*ProKey 4.0* can do all that too.

Even on some of the subtle features, *ProKey* is right in there swinging. It, too, will blank your monitor if you leave your keyboard untouched for 10 minutes. It also lets you expand the keyboard buffer.

If, however, you need file encryption and you like the idea of macros that lock your keyboard or blank your screen, you'll have to turn to *SuperKey*. *ProKey 4.0* also lacks *SuperKey's* data entry control, display macros, and ability to cut and paste between programs.

A New Outer Shell

While *ProKey* fans will still recognize *ProKey 4.0*, the program is wearing

some fancy new duds. The fanciest is its new menu-driven shell. If you don't like menus, the old *ProKey* commands work as they did before.

ProKey 4.0 also boasts some features that *SuperKey* doesn't match. You can insert timed pauses into your macros, ranging from one-tenth of a second up to 256 hours. If you have a hard time remembering what macro gives you boldfacing or marks a text block, *ProKey 4.0* lets you create names of up to eight characters for your macros. You can call one macro "bold" and another "block." *ProKey 4.0* also allows you to guard macros so they can't be overwritten when you load or merge in a new macro file. And *ProKey 4.0* fixes one longstanding problem suffered by *ProKey* users: ASCII synonyms. These insidious little beasts can create confusion by redefining keys you never wanted to change. For instance, if you stored your printer's italics command in a macro invoked by Ctrl I (ASCII 9), you would see the macro every time you pressed the Tab key (also ASCII 9). *ProKey 4.0* has done away with ASCII synonyms because it now treats each key separately. With *SuperKey*, ASCII synonym problems are still possible but unlikely because the program warns you if you're about to redefine a useful key.

A Problem or Two

When I tested *ProKey 4.0* within days of its release, it was not without a problem or two. My trusty *Volkswriter Deluxe* wouldn't load until I'd played around with *ProKey 4.0's* buffer sizes.

The multicharacter macro name didn't work when the macro name was in uppercase letters. And the BASIC program that creates a macro containing today's date wouldn't work until I tinkered with it, changing its file output to drive A: instead of drive C: (which my machine doesn't have).

But, overall, *ProKey 4.0* has a lot of class and shows the usual RoseSoft attention to detail. The manual is in an IBM-size loose-leaf binder with a handy pull-out reference card. The program also comes with a group of well-documented "starter set" macros to give you an idea of what macros can do for you with *WordStar*, *1-2-3*, *dBASE II*, and *Office Writer*. *SuperKey* also has sample macro files, but they don't measure up to *ProKey's*, which are more sophisticated and have better explanations.

And only *ProKey* is completely *ProKey* compatible. So, with its upgrade price of \$39.95 to registered *ProKey* owners, RoseSoft is in a good position to bid for the continued loyalty of the estimated 50,000 *ProKey* users.

—Dara Pearlman



ProKey 4.0

RoseSoft
4710 University Way N.E., #601
Seattle, WA 98105
(206) 524-2350
List Price: \$130

Requires: 40K RAM above memory needed for applications, one disk drive.
CIRCLE 656 ON READER SERVICE CARD

macro editor is infuriatingly brief and leaves you to discover on your own that you can use the arrow and delete keys as editing keys but can also include them in a macro if prefaced by the backwards apostrophe key. Also, a program with this many features fairly begs for an appendix summarizing the commands and internal codes. Although the manual does list them, they're not always easy to find.

SuperKey doesn't always behave itself with other programs. When I tried it with *WordStar 3.3* on my PC, which is equipped with a graphics card and an off-brand monochrome monitor, *SuperKey* turned my text into faint, unreadable lines whenever I tried to define a macro. Borland's Holt investigated and says that a *WordStar* patch will be available to *SuperKey* users who encounter this snag.

Another problem is that some of *SuperKey*'s features don't work with programs that use the PC's graphics mode, such as *Microsoft Word*. When you define a macro while running *Word*, it turns the screen into a mosaic picture, with only *SuperKey*'s prompts as readable text. Thus you can't use *SuperKey*'s cut-and-paste feature to pluck text from a *Word* document (unless you run *Word* in its color mode). When I tested *SuperKey* with *Word*, the one-finger mode and alternate-cursor key function also didn't work.

ProKey users should be aware that despite Borland's claims, *SuperKey* does not accept all *ProKey* macro files. If your *ProKey* macro includes a mode switch, such as the command that tells *ProKey* to slow down, *SuperKey* won't recognize the command. You can fix this by changing the *ProKey* commands to *SuperKey* commands using *SuperKey*'s macro editor, but you'll have to figure out how to do it yourself. The manual is mum on the subject.

These problems are, however, mostly minor irritations. *SuperKey* is one super little program, with a lot of useful tools and entertaining gadgetry. Like *Turbo Pascal* and *SideKick*, *SuperKey* is a genuine bargain, and it's likely to become another star at the software supermarket. ■

Dana Pearlman, a regular contributor to PC Magazine, reviewed ProKey 3.0 and SmartKey 4.1 in the May 14 issue (Volume 4 Number 10).

Will you be playing Russian Roulette with your next important buying decision?



When you're under the gun, turn to DATA DECISIONS MICROCOMPUTERS

MICROCOMPUTERS is an all-new information service for the multiple micro buyer. It comes in 3 monthly updated loose-leaf volumes that give you:

- Independent hands-on evaluations of micro software and peripherals.
- Quick-reference rating charts that let you compare competing packages.
- In-depth analyses that highlight specific strengths and limitations of hardware, software and peripheral products.
- Action-oriented technology reports that fill you in on issues and trends.
- Broadbased surveys...reliable user ratings...lively monthly newsletters...a comprehensive vendor directory for the U.S. and Canada.
- PLUS...Unlimited free telephone consulting by micro experts whose only job is to answer your questions.



Whether you're looking for 10 micros or 100, an integrated software package, printers, graphics—or the right combination of products capable of working together, **Data Decisions MICROCOMPUTERS** has the information you need.

To find out how you can receive **MICROCOMPUTERS** for a no-purchase-obligation Trial Review, just fill in and return the coupon. Or, better yet, **Phone Today: (609) 429-7100**

DATA DECISIONS 20 Brace Road • Cherry Hill, NJ 08034

DATA DECISIONS
20 Brace Road • Cherry Hill, NJ 08034

A306



☐ YES! Please tell me how I can receive **MICROCOMPUTERS** for a no-purchase-obligation trial review.

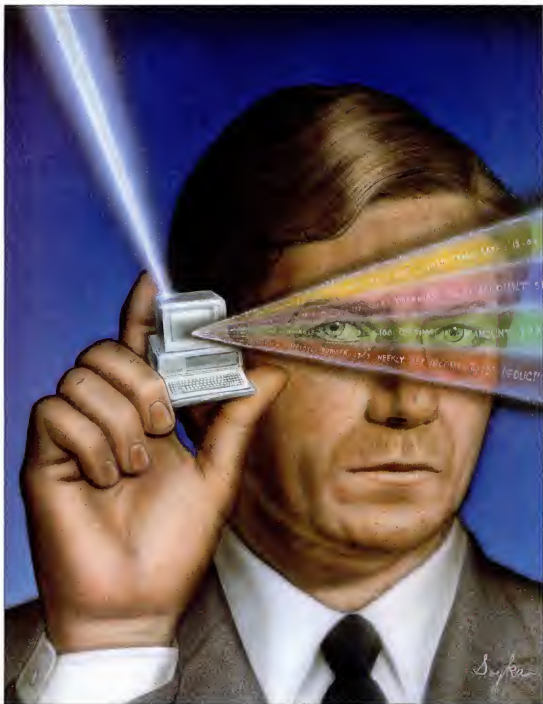
Name

Title Phone ()

Company

Address

City, State, Zip



Since its inception 4 years ago, *RealWorld Software*, a series of accounting programs for the PC, has been a leader in the full-featured accounting software market. However, many very small or embryonic businesses find this sophisticated program too complex for their needs. RealWorld Corporation recently addressed this problem by introducing *4-in-1 Basic Accounting*, a set of four accounting modules designed for businesses with

that the data you enter into your general ledger is accurate.

Simple and Straightforward

In order to accommodate the needs of businesses with only a small number of customers, vendors, or employees, the *4-in-1* system does not use customer, vendor, or employee numbers or codes. Instead of codes, *4-in-1* allows you to use the corresponding names. For example, to retrieve account information for Jan's Appliance Store, you can enter the full name or just the first few letters. If you enter just J, then the system will display the first customer that begins with a J. If this is not the customer you wanted, you can press the F1 key to retrieve the next customer, or you can enter more or all of the customer's name.

Of course, to create a significantly less-complicated and less-costly product, RealWorld has omitted several advanced features from *4-in-1* that it included in *RealWorld Software*. For example, the *4-in-1* payroll module is an after-the-fact payroll system: it does not calculate your payroll; you do—by hand or calculator. However, it is quite helpful in assisting you in recording and tracking your payroll information and in printing key payroll reports based on the calculated payroll data you enter into the system each pay period. Other things that mark this as an entry-level system include the omission of some reporting options (for example, *4-in-1* gives aged accounts receivable and accounts payable reports in summary form but not in detail) and any budgeting ability.

Installing the system on a hard disk is a snap. You simply place the installation disk in drive A: and type **HARDISK**. The process takes about an hour, and the very complete installation guide should cover any problems you encounter.

Upon entering the system, you're presented with the main menu (see Figure 1), which gives you access to each module's major functions and clearly illustrates both the package's breadth and its basic nature.

A Congenial Ledger

The *4-in-1* general ledger module offers a great deal more flexibility than is usual for a basic system. You construct a chart of accounts around a two-part account num-

4-in-1 Accounting The Basics From RealWorld

The 4-in-1 Basic Accounting System meets small-business financial needs with a reduced version of its RealWorld parent.

sales of under \$2 million. In fact, this program cannot accommodate more than \$10 million in annual revenue.

The *4-in-1 Basic Accounting* system includes general ledger, accounts payable, accounts receivable, and payroll modules. It is simple to master, and yet it contains many of the features that made its parent system so popular.

4-in-1 also offers features that make it easier for the novice accountant. All the submodules (accounts receivable, accounts payable, and payroll) automatically interface with the general ledger. So, when you post transactions to a submodule, it not only updates data files in the submodule, but it also updates your account balances in the general ledger. In many full-function accounting systems, you must perform a separate process to update the general ledger with submodule data. While easier to use, this program does warrant extra care—you must make sure

ber. The first part of the account number contains a four-digit primary account code, such as 1000—cash, 1100—accounts receivable, and so forth. The second part of the account number—a three-digit subaccount—allows you to departmentalize your chart of accounts. A chart of accounts configured in this manner lets you produce financial reports by department or profit center; it's a feature normally found only in full-function (and more-expensive) accounting systems. The software gives you three different predefined charts of accounts: one is for a wholesaler, one is for a retail business, and one is for a small manufacturer. These templates are a real convenience if your financial reporting needs are similar to any of these three types of businesses. You can, of course, modify these charts to suit your individual needs.

Entering general ledger transactions is a two-step process. First, you enter individual transactions into a temporary work file, called a batch. You can then print, review, and edit this batch file before you actually update the general ledger. The second step consists of posting the entire batch to the general ledger. If the batch is not in balance—say, for example, the debit and credit amounts are not equal for all transactions in the batch—then the system will not post any of the transactions in the batch to the ledger. That's a blessing because this second step saves you from your own mistakes by forcing your general ledger to remain in balance.

One disappointing feature of the 4-in-1 batch-processing system is that sales transactions are sorted by account number and date when listed in the general journal for editing. Normally, you enter transactions in logical groups, such as one or more debits with corresponding credit(s), but the sorting process eliminates these logical groupings and could make it difficult for you to audit your entries. For instance, assume that you enter the following transactions:

Interest expense	100.00DR
Cash	100.00CR



Figure 1: The 4-in-1 main menu lets you access the major features of all four of its accounting modules.

Misc. G & A expense	100.00DR
Suspense	100.00CR

The system would then give you a batch listing, called a transaction edit list, that offers details by account, not by the order you enter them into the system. The system does have a fast way for you to verify the accuracy of your entries, but I would much prefer that the system give both the report shown in Figure 2 and a listing of the transactions just as you enter them.

The 4-in-1 system comes equipped with a financial report writer that allows you to create customized financial statements using data from your general ledger. Although 4-in-1's report writer is not very sophisticated, introductory-level accounting systems rarely have this capability. And the report writer is so flexible and simple, you can actually have fun creating your financial reports.

You can use the report writer to create either balance sheet or profit-and-loss financial statements developed from the current period or year-to-date general-ledger account balances. In developing your reports, you can accumulate account balances, accumulate and print up to nine levels of subtotaling (in any of the three available columns), and print text anywhere on the financial report. Once you've established a report format, you can use it to print that report for any or all of your de-

partments or profit centers. The system offers only nine report formats, which is a sufficient number for the majority of small businesses.

The 4-in-1 accounts receivable module includes the basic functions of most entry-level accounts receivable systems as well as an invoicing ability.

You can track sales data by customer, record and process cash receipts, print customer-aging reports and customer statements, and update the general ledger directly. The software also incorporates features that process and print debit/credit memos and finance charges, process recurring sales transactions, and record and print miscellaneous charges, sales tax, and freight charges for each invoice.

The method employed to capture customer sales information (to record the transaction as well as produce an invoice) is rather unique and reflects the basic nature of this system. It involves a two-step process. You use the sales entry screen (see Figure 3) to enter information about a sales transaction, including the detailed financial account distribution. After you enter this data, the system offers you the option of preparing an invoice (see Figure 4). If you choose to do so, you are prompted to enter a shipping address, purchase-order number, shipping method (UPS, Air Freight, and so forth), payment terms, shipping date, miscellaneous charges, sales tax and freight charges—all of which are optional. You can then enter up to three lines of text for each line item (item or ser-

PC

4-in-1 Basic Accounting

Real World Corp.
Willow Hill Bldg./Dover Rd.
Chichester, NH 03263
(800) 255-1115

List Price: \$995

Requires: 128K RAM with DOS 2.x or 192K RAM with DOS 3.x; dual 320K disk drives or a hard disk; 80-column printer.

CIRCLE 695 ON READER SERVICE CARD

vice sold) to be included on the invoice as well as the price of each line item. The total invoice amount, which is displayed at the bottom of the screen, decreases as you enter each item. Once you enter all the items and the invoice data is complete, the total invoice amount becomes zero and you can print the invoice.

It is important to notice that simply entering freight, tax, or miscellaneous charges won't ensure a proper accounting for these amounts. You must accurately distribute the total amount of the invoice using the screen in Figure 3. Full-featured, more-expensive systems automatically record these amounts in the proper financial accounts, based upon tables you establish when you set up the system.

4-in-1's pricing/invoicing capabilities are not sophisticated. But, if the system is right for your business, you wouldn't want an end-all invoicing function because it would probably not fit your needs and would be so burdened with options as to be ineffective. Many very small businesses need only a simple means of preparing invoices and recording the resulting receivables.

With the aged accounts receivable summary report, you receive a one-line listing per customer showing the amount outstanding on a 30-, 60-, or 90-day period. Certain print options allow you to print a report for one or more given customers (instead of the whole customer list), set a cut-off date or specific timeframe, and specify salespersons so that only customers of a particular salesperson appear in the report.

Tracking Vendors

With the **4-in-1** accounts payable module, you can create and maintain information on each of your vendors, enter vendor invoice data, print, review and post these transactions, print checks, and produce several useful reports. Aside from the typical vendor maintenance routines, this module offers two main functions: you use one to enter and process invoices due your vendors and the other one to record and process disbursements and print checks.

The bills payable function records data from vendor invoices, including the vendor name, the type of transaction (invoice, credit, or debit memo), the invoice number, a 25-character reference field, the

4-in-1's financial report writer allows you to create customized financial statements.

amount, and the account number to be credited by this transaction. You can establish recurring invoices for weekly, monthly, quarterly, semiannually, or annually scheduled recurring disbursements. Missing, of course, from this list of vendor invoice data is the invoice due date. **4-in-1** does not capture this important piece of information and, therefore, does not employ an automatic payment selection function, as many comparable packages do. You will have to use the disbursements function to schedule the payment of each check individually.

You use the disbursements function to both initiate the production of computer-generated checks and record handwritten checks. When entering a disbursement, you can specify the type of check (computer or manual), the check number, amount and date, the discount taken, and the

checking account from which the check is to be written. The documentation explains how to record bills and disbursements whether you utilize cash basis or accrual basis accounting.

The accounts payable (and accounts receivable, as well) module has a handy feature that allows you to add a vendor (or customer) "on the fly." For example, if you are in the bills payable function and find that you need to enter an invoice for a vendor not yet established in your vendor file, you are not required to exit the bills payable function in order to use the vendor maintenance function to add that vendor. You enter the new vendor's name, and the system will display the message "Vendor not on file—do you wish to add it?" When you answer yes, the system immediately displays a vendor add screen. When you finish entering the appropriate data, the system returns you to the bills payable function. This type of feature, though not truly an accounting function, sure does make the system more accommodating to the small-business environment.

Although not directly included in the accounts payable function, several unique **4-in-1** features help you manage your

Date 01/01/97	KEE'S ICE CREAM STORES, INC.			#0017 Page 0001
GENERAL JOURNAL TRANSACTION EDIT LIST				
Period: 01/01/97 to 01/31/97				
Account: 1010-000 Checking - General				
Trans-date 01/01/97	Debit-amt	Credit-amt	Reference	
		100.00	Cash	
Account: 7800-000 Misc G & A expense				
Trans-date 01/01/97	Debit-amt	Credit-amt	Reference	
	100.00		Employee Education	
Account: 9100-000 Interest expense				
Trans-date 01/01/97	Debit-amt	Credit-amt	Reference	
	100.00		Interest for period	
Account: 9999-000 Transfer/suspense account				
Trans-date 01/01/97	Debit-amt	Credit-amt	Reference	
		100.00	Suspense	
Grand totals: 200.00 200.00 4 Transactions				
-- End of report --				

Figure 2: The 4-in-1 "transaction edit list" reports transaction details in order of account, not in the order you entered them into the system.

Borland Introduces the Laws of **TURBO DYNAMICS**™

Laws That Work Like Magic. Whether considering technological excellence, or innovation in areas such as pricing, not copy-protection, licensing agreements, site licenses, 60 day money-back guarantee —Borland is clearly recognized as the software industry leader. The following three laws of "Turbo Dynamics"™ exemplify our pledge for excellence.

2ND LAW:

NOT COPY-PROTECTED SOFTWARE AND REASONABLE LICENSING AGREEMENTS.

We will always offer not copy-protected versions of our software. Also, our licensing agreement is now so simple that even a child can understand it.

1ST LAW:

SPEED, POWER AND PRICE.

Borland products are known to be fast, powerful and to deliver an incredible price performance ratio. We only believe in absolutely superb software at rock bottom prices.

3RD LAW:

60 DAY MONEY-BACK GUARANTEE.

This third law is actually a first in the industry! We are so sure that you will love our software that all of our products now come backed with a 60 day money-back guarantee. No questions asked.

Turbo Dynamics Applies to Turbo Pascal.

Borland's Pascal family of products is growing by leaps and bounds.

You can now join hundreds of thousands of users and enter the world of Turbo Pascal programming. And remember, all three laws of Turbo Dynamics apply to all Borland products.

TURBO PASCAL™ \$69.95

The industry standard. With more than 350,000 users worldwide Turbo Pascal is the industry's de facto standard. Turbo Pascal is praised by more engineers, hobbyists, students and professional programmers than any other development environment in the history of microcomputing. And yet, Turbo Pascal is simple and fun to use. **Free spreadsheet** included on every Turbo disk with ready-to-sample source code. **Options:** We offer the exciting Binary Code Decimal (BCD) option for your business applications as well as an 8087 option for your number-crunching applications at a very low charge. Please refer to the coupon. **Portability:** Turbo Pascal is available today for most computers running: PC-DOS, MS-DOS, CP/M 80 or CP/M 86. **Aut Outsource, PC Magazine:** "In its simplicity it achieves an elegance that no other language compiler has ever displayed."

TURBO GRAPHIX TOOLBOX™ \$54.95

High resolution monochrome graphics for the IBM PC.

The Turbo Graphix Toolbox will give even a beginning programmer the expert's edge. It's a complete library of Pascal procedures and functions. Tools that will allow you to draw and hatch pie charts, bar charts, circles, rectangles and a full range of geometric shapes. Procedures that will save and restore graphic images to and from disk. And much, much, more. You may incorporate part or all of these tools in your programs and yet we won't charge you any royalties. Best of all, these functions and procedures come complete with commented source code on disk ready to compile.

TURBO TUTOR™ \$34.95

From start to finish in 300 pages. Turbo Tutor is for everyone from novice to expert. Even if you've never programmed before Turbo Tutor will get you started right away. **A must.** You'll find the source code for all the examples in the book on the accompanying disk ready to compile. Turbo Tutor might be the only reference on Pascal and programming you'll ever need.

TURBO DATABASE TOOLBOX™ \$54.95

The Turbo Database Toolbox is the perfect complement to Turbo Pascal. It contains a complete library of Pascal procedures that allows you to sort and search your data and build powerful applications. It's another Borland set of tools that will give the beginning programmer the expert's edge. **Get started right away from disk!** Included on every Toolbox disk is the source code to a working data base which demonstrates how powerful and easy to use our search system, Turbo-Access, really is. Modify it to suit your individual needs or just compile it and run. **Remember, no royalties!**

TURBOPASCAL FAMILY

Available at better dealers nationwide. Call (800) 556-2283 for the dealer nearest you. To order by Credit Card call (800) 255-8008. CA (800) 742-1133

Carefully Describe your Computer System:

Mine is _____ 8-bit _____ 16-bit
I use _____ PC-DOS _____ MS-DOS
_____ CP/M 80 _____ CP/M 86
My computer's name/model is _____

The disk size I use is

☐ 3 1/2" ☐ 5 1/4" ☐ 8"

Name _____

Shipping Address _____

City _____

State _____ Zip _____

Telephone _____

60 DAY
MONEY-BACK
GUARANTEE

Pascal 3.0 \$ 69.95
Pascal w/8087 \$109.90
Pascal w/BCD \$109.90
Pascal w/8087 & BCD \$124.95

Turbo Database Toolbox \$ 54.95
Turbo Graphix Turbo Tutor \$ 34.95

*These prices include shipping to all U.S. cities. As foreign orders add \$10 per product ordered.

Amount (CA 8% tax) _____

Payment VISA MC BankDraft Check _____

Credit Card Exp. Date _____

Card # _____

COOs and Purchases Orders WILL NOT be accepted by Borland. California residents, add 6% sales tax. Outside USA, add \$10 and make payment by bank draft, payable to US dollars drawn on a US bank.



4585 Scotts Valley Drive, Scotts Valley CA 95066

Phone (408) 438-8400 Telex 172373

CIRCLE 147 ON READER SERVICE CARD

Copyright 1985 Borland International BI-0101

Turbo Pascal, Turbo Database Toolbox, Turbo Graphix Toolbox, Turbo Tutor and Turbo Dynamics are trademarks of Borland International, Inc.

THE PRICE WATERHOUSE REPORT



Figure 3: The 4-in-1 sales entry screen lets you distribute a transaction amount to any number of general ledger accounts.



Figure 4: The total invoice amount, shown at the bottom of the screen, decreases automatically as you enter each item.

checking accounts. For example, if you want to maintain three separate checking accounts, you assign each account to a specific financial account number during installation. The system's routines allow you to record adjustments to individual checking accounts or cash transfers between checking accounts with a single entry; however, if you want to transfer money between checking accounts using a standard general ledger entry, you would have to enter two separate transactions.

Another useful feature helps you reconcile the three bank accounts. The system displays all checks written between any two specified dates, and using your bank statement, you simply mark all those items that have cleared the bank. When you're done, you can print a reconciliation report.

Zero Calculations

As mentioned earlier, the 4-in-1 payroll module does not actually perform the basic payroll computations, such as the calculation of gross pay, tax withholdings, FICA, and so forth. You must do these yourself. But what 4-in-1's "after the fact" payroll module does do for you is help you keep track of, accumulate, and report all of the payroll data. With the system, you can also establish an employee master file that maintains payroll totals by employee. In addition, using the pay and deduction figures that you enter each pay period, 4-in-1 will print payroll checks and update your

employee payroll history file. The system automatically accumulates the quarterly and year-to-date figures needed to produce the basic federally and state-mandated payroll reports. It will print your payroll register, payroll checks, an employee history report, quarterly payroll report, a non-employee compensation report, and W-2 forms.

One significant limitation of the payroll module is that it will capture only one deduction amount plus the standard state and federal tax amounts. For example, if you establish two deductions for an employee, the system will track only the total amount of these deductions.

As with customer statements, 4-in-1 prints invoices, payroll, and disbursement checks in a predefined format. You cannot alter these formats and, therefore, it is unlikely that you can use your existing forms for these documents with the system. However, the manual provides brochures from three vendors that market forms tailored to the 4-in-1 system.

30-Day Support

RealWorld makes learning and using 4-in-1 easier with good help screens. You simply press the F10 key to get text explanations of the process you're currently using. If that's not enough, RealWorld offers hotline support over the phone, but it's only free for the first 30 days you own the package. RealWorld's documentation continually urges you to consult your ac-

countant—a good suggestion, particularly when you're setting up your system.

The documentation consists of a single sturdy three-ring binder that combines descriptive yet concise text and plenty of illustrations. The screen illustrations would have been much more helpful if they had sample data. The manual summarizes all error messages in the appendices as well as the recommended back-up and restore procedures.

Although you can run the 4-in-1 package on a dual floppy drive system, a hard drive will give you faster access to your data files. We evaluated the program on an XT and found the system's performance to be a bit slow until we changed the CONFIG.SYS file to include BUFFERS = 25. With this change, the system's speed dramatically increased.

RealWorld did a good job of scaling down the features and sophistication of its more-expensive, full-function accounting system to create 4-in-1. 4-in-1 can take on most of the accounting chores of many very small or emerging enterprises. However, you are the only one who can say whether or not it has enough horsepower for your business.—Thomas W. White and G. William Dauphinais

Thomas W. White is a consultant for Price Waterhouse. G. William Dauphinais is a Management Consulting Services partner for Price Waterhouse. Both work in the firm's Sacramento office.

Borland's SuperKey™

lets one powerful keystroke do the work of hundreds and helps keep your confidential files . . . confidential!

SUPERKEY TURNS 1,000 INTO 11 Yes, SuperKey can record lengthy keystroke sequences and play them back at the touch of a single key. Instantly. Like Magic. Say, for example, you want to add a column of figures in 1-2-3. Without SuperKey you'd have to type seven keystrokes just to get started. ["shift-@-s-u-m-shift-("). With SuperKey you can turn those 7 keystrokes into 1.

SUPERKEY HELPS PROTECT YOUR CAPITAL INVESTMENT. SuperKey, at your convenience, will make your screen go blank after a predetermined time of screen/keyboard inactivity. You've paid hard-earned money for your PC. SuperKey will protect your monitor's precious phosphor . . . and your investment. This feature alone justifies your SuperKey purchase!

SUPERKEY KEEPS YOUR 'CONFIDENTIAL' FILES . . . CONFIDENTIAL! Time after time you've experienced it: anyone can walk up to your PC, and read your confidential files (tax returns, business plans, customer lists, personal letters . . .). With SuperKey you can encrypt any file, even while running another program. As long as you keep the password secret, only YOU can decode your file. SuperKey implements the U.S. government Data Encryption Standard (DES).

SUPERKEY PROTECTS YOUR WORK FROM INTRUDERS WHILE YOU TAKE A BREAK.

Now you can lock your keyboard at any time. Prevent anyone from changing hours of work. Type in your secret password and everything comes back to life . . . just as you left it.



THE CRITICS' CHOICE

"It's unquestionably the best new program I've seen since Borland's SideKick."

Stephen Messer, PC Magazine

"The encryption features were extremely easy to use because of some elegant incorporation of pull-down menus and clear prompts . . ."

SuperKey is a large amount of functionality in a small amount of code at a low price."

Victor Marshall, PC Tech Journal



4585 Scotts Valley Drive, Scotts Valley CA 95066
Phone (408) 438-8400 Telex 172373
CompuServe - GO BOR

CIRCLE 149 ON READER SERVICE CARD
Copyright 1985 Borland International BI-1009B

SuperKey and SideKick are trademarks of Borland International, Inc.
1-2-3 is a trademark of Lotus Development Corp.
IBM is a registered trademark of International Business Machines Corp.

Get your IBM PC or compatible a SuperKey today.

SuperKey

NOT COPY-PROTECTED

\$69⁹⁵

This price includes shipping to all US. Credit ONLY. All Canadian orders add \$10 per item ordered. Outside U.S.A. and Canada, see below.

60 DAY
MONEY-BACK
GUARANTEE

YES! Please rush SuperKey to me. Send me _____ copies.

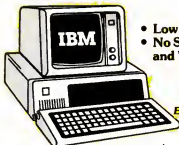
Name _____
Shipping Address _____
City _____ Zip _____
State _____
KB Telephone _____

Subtotal _____
(CA res. add 4.20 tax per copy)
Amount Enclosed _____
Payment VISA MC Bank/Draft Check
Credit Card Exp. Date _____
Card # _____

GOODS AND PURCHASE ORDERS: UNLESS PREPAID, WILL NOT be accepted by Borland California residents: add 9% sales tax. Canadian orders add \$10 per item and must be prepaid by bank draft payable to US. Orders in Mexico, USA and Canada due to US restrictions on export of technology purchased in SuperKey (without DES) can only be made through authorized distributors. Contact nearest distributor for your area to return SuperKey.

Save

1-800-231-9842
WESTERN REGIONAL ORDERS



- Low Low Prices
- No Surcharge for MasterCard and VISA

1-800-237-4048
EASTERN REGIONAL ORDERS

• COMPUTERS •

IBM ENHANCED AT	5355
IBM ENTRY LEVEL AT	3647
IBM PC, 1 DSDD DR,	
256K	1595
IBM PC, 2 DSDD DR,	
256K	1705
IBM PC, NO DRIVES,	
64K	1293
IBM PC, 2 HALF/HYTES,	
256K	1631
IBM XT, 1DSDD	
DR/10MB, 256K	3355
IBM XT, 1DSDD DR/ TANDON	
HD, 256K	2108
COMPAQ, 2 DSDD,	
256K	2153

• MONITORS •

AMDEK 300G	116
AMDEK 300A	132
AMDEK 310A	143
AMDEK 600 RGB	
COLOR	407
AMDEK 710 SUPER	
HI RES COLOR	523
IBM COLOR	605
IBM MONOCHROME	231
PRINCETON MAX-12	154
PRINCETON HX-12 RGB	
COLOR	446
PRINCETON SR-12/SCAN	
DOUBLER	572
QUADRAM	
AMBERCHROME	171
QUADRAM	
QUADCHROME II	424

• MISCELLANEOUS •

MEMORY, 64K CHIPS	8
MEMORY, 256K CHIPS	39
PRINTER CABLE	10
MICROFAZER BUFFER,	
8K	131

MICROFAZER BUFFER,	
64K	212
VERBATIM, DSDD DISKS	20

• DISPLAY CARDS •

STB SUPER HI RES 400	402
HERCULES COLOR	145
IBM MONOCHROME	215
IBM COLOR	226
EVEREX GRAPHICS	
EDGE	325
GENOA SPECTRUM	295
TECMAR GRAPHICS	
MASTER	459
PARADISE MODULAR	
GRAPHICS	261

• BOARDS •

AST SIX PACK PLUS,	
64K	248
AST MEGAPLUS, 64K	281
AST MP-2, 64K	228
AST ADVANTAGE, 128K	384
AST I/O PLUS	122
JRAM-2	169
QUADRAM QUADBOARD	
ØK	240
QUADSPRINT	418
TECMAR CAPTAIN, ØK	219
TECMAR FIRST MATE,	
ØK	200
TECMAR WAVE XT, 64K	187
TECMAR JR CAPTAIN,	
128K	295

• MODEMS •

HAYES 2400	627
HAYES 300	138
HAYES 300/1200	407
HAYES 1200B w/	
SOFTWARE	380
HAYES 1200B	351
VEN-TEL HALF CARD	374
VEN-TEL 300/1200	
INTERNAL	341
AST REACH HALF CARD	
1200	362

• PRINTERS •

OKIDATA 83A, WIDE	
CARRIAGE	545
OKIDATA 84P, WIDE	
CARRIAGE	660
OKIDATA 92P	385
OKIDATA 93P, WIDE	
CARRIAGE	602
OKIDATA 2410P	1782
OKIDATA 182	215
OKIDATA 192	363
OKIDATA 182S	259
OKIDATA 184	660
EPSON FX-80,	
TRACTOR	382
EPSON LX-80	248
EPSON FX-185, WIDE	
CARRIAGE	417
EPSON FX-100, WIDE	
CARRIAGE	531
EPSON JX-80 COLOR	
PRINTER	531
EPSON LQ-1500	
PARALLEL	1042
NEC 2050	682
NEC 3550	1045
NEC 8850	1458
JUKI 6100	362
JUKI 6300	695

• ACCESSORIES •

OKIDATA 82/92	
TRACTOR	44
NEC BI-DIRECTIONAL	
TRACTOR	151
NEC CUT SHEET GUIDE	63
JUKI 6100 BI-DIRECTIONAL	
TRACTOR	105
JUKI 6300 BI-DIRECTIONAL	
TRACTOR	124

**"For All Your
Computer Needs"**

COMPUTER MART

1901 S. TAMiami TRAIL, VENICE, FL 33595
2820 W. CHARLESTON, LAS VEGAS, NV 89102

Call for Non-Advertised and Lower Current Prices.
IBM is a registered trademark of International
Business Machines. Prices subject to change. We
accept MasterCard, VISA, American Express, Discover
Club, Money Orders, certified and personal checks.
2% surcharge for shipping and handling. \$5 minimum.
Returns are subject to a 30% restocking fee.
IN FLORIDA CALL 813-493-2736
IN NEVADA CALL 702-877-3988



A Practical Look at PRINTER SHARING

Connector boxes and boards can make it economical for several computer users in the same office to share one printer. One of these five switching devices might be what your office needs.

If you've been complaining a lot about the high cost of printers, you ought to think seriously about the practical benefits of sharing one. No, printer sharing doesn't mean that you pack up the printer and lug it between offices. You simply make the necessary electrical connections among several computers so that they can all use the same printer or group of printers.

That's a vague description of printer sharing, but, then, no standard actually exists. A printer-sharing device is any piece of equipment, other than a true network, that allows two or more computers to share one or more printers. The idea is to network the printers, not the computers.

The ideal printer-sharing system should be able to hook up any number of computers to a printer, but, for practical purposes, four is a good number. Obviously, an expensive peripheral like a laser printer offers a compelling reason to get into a printer-sharing system: all the users split the high cost. It makes good financial sense for four executives to share one \$5,000 laser printer because none of them would be likely to use the printer for more than 25 percent of the day.

The ideal multiple-access system would also offer its users a choice of three

printers: a high-speed dot matrix printer for quickly drafting documents, a daisywheel printer for quality correspondence, and a laser printer for the highest-quality print, enhancements, and graphics. Any three or four people with computers should be able to justify a joint purchase of all three types of printers, considering the wider range of possible uses.

To make multiple-printer access pay off in spades you need simultaneous printing capability. In other words, the ideal device would have a large, segmented memory buffer that could send data to two or three printers at the same time, either from the same PC or from all the computers in the system. In all cases, the printer buffer should accept the data from a computer and free the CPU for other work.

Print spooling should be one of the side benefits of printer sharing. Thus, a good printer-sharing device should have as many print buffers as it has users or at least provide a way of accepting all incoming data no matter how busy the device.

But, how do you signify which printer the device should use for each document? In the ideal system, firmware that tracks on-line devices and the allocation of buffer memory would prompt you on your display. For example, if the laser printer is

currently active, your request to print would receive a return message such as "Dot matrix and daisywheel available. Type DM or DW. Type L to queue up for laser." If all printers are active, a request to print causes the device to convey that information back to you, along with a choice of queuing up for any one of the printers.

Lacking a standard method of monitoring buffer memory and returning messages to the individual displays, I decided the ideal system should use simple codes at the head of each file for making printer selections. A printer-sharing device would store and output a file beginning with Alt-1 to printer 1, Alt-2 to printer 2, and so forth. Of course, this method does not let you know how long it will take before the document is ready.

Finally, to conserve memory and processing power in the individual computers, the ideal printer-sharing device would be an external box with its own power supply. It would be ordered in any configuration of standard DB-25 serial and Centronics parallel ports, with each port switch selectable between input and output.

This ideal system does not exist. But here are the capabilities and limitations of five printer-sharing devices that cover a wide range of sophistication and price.

PRINTER SHARING

PC Switch, AB Model

The Hadax PC Switch, available with either serial or Centronics parallel ports, is known as a T-switch (or switcher). It is a small box with two push buttons on the front, A and B. When you push A (active), B is not active, and vice versa. It is not possible to simultaneously activate both push buttons.

On the back of the box are three ports, labeled A, B, and COM. The switch accommodates a computer hooked to the COM port and a pair of printers in the remaining ports. By simply pressing button A or B on the front panel, you get a choice between two printers, but it isn't really printer sharing. However, when I turned things around and plugged a printer into the COM port and two computers into ports A and B, it worked fine. I pressed the A button and fed the switcher a document

from computer A, which immediately began printing. I then issued the command to print from computer B, waited for the first print job to end, pressed button B on the switcher, and verified that document B was still intact.

This type of device has no memory

The Hadax PC Switch has no memory buffer inside.

In fact, the box itself far outweighs what is inside, which is just a simple switch device with some wires and a little solder.

buffer inside. In fact, the box itself far outweighs what is inside, which is practically nothing. It is just a simple switch device with some wires and a little solder. In the world of computer hardware, you don't get much for \$100.

A T-switcher might be the ideal device, however, for two people who use their computers in the same room and don't need software to control printer use. They can see and hear when the printer is busy. However, the only productive way to make this arrangement work is for each computer to have its own print spooler. Without a spooler, you can't issue the command to print, move on to other work, and press your button on the switcher when the printer is free.

Because Hadax sent both the serial and parallel port models of its switcher, I decided to experiment by connecting the COM port of the serial model to the parallel model's COM port and plugging the parallel model's twin Centronics cables into a pair of printers, one daisywheel and one dot matrix. Finally, I connected two PCs to the A and B ports of the serial model PC Switch.

It worked as I'd hoped it would. I now had a printer-sharing system that gave two computers a choice between two printers, albeit physically selected by the switches on the front panels.

Hadax also offers an ABC model (three computers and one printer or vice versa)

for \$145 in serial and \$185 in parallel. An ABCD model (four computers and one printer or vice versa) is available in serial only for \$160.

This may be a poor man's network, but it works. As far as reliability goes, you don't have much to worry about with this device except for its push-button switches. I gave each model a 5,000-push test before hooking them up the first time.

Selecto-Switch, Model 5410

The 5410 Selecto-Switch from Giltronix is an ABC (three-way) switcher with nothing but a three-position knob on its front panel. Like the Hadax models, it comes in both serial and Centronics parallel port configurations and allows one computer to share three peripherals.

I asked myself: If one computer can share three printers, why can't the Giltronix unit handle three computers sharing one printer? I used an XT, a PC, an Apple II, and a Panasonic dot matrix printer to test my theory. With the switch in position A, I sent a text report from the XT and it began printing. Immediately, I issued a command to print a spreadsheet from the PC and a command to print a title page with graphics from the Apple II.

When the printer ended its job on the text report, I switched the knob to B, and the printer began churning out the spreadsheet that had been waiting for its chance to print from the PC. At the end of the spreadsheet, I switched the device to C and the Apple II began printing the graphics.



The Hadax PC Switch, AB Model (top), is inexpensive and requires little technical knowledge to use. The Giltronix Selecto-Switch, Model 5410 (bottom), is a three-way switcher that comes in both serial and parallel port configurations.

PC Switch, AB Model

Hadax Electronics
44 Seacraft Ave.
Glen Cove, NY 11542
(516) 676-3386

List Price: PC Mate for parallel connections, \$99.50;
Hadax 1220 for serial connections, \$95

CIRCLE 855 ON READER SERVICE CARD

Interfacer

Quadrant Corp.
4355 International Blvd.
Norcross, GA 30093
(404) 923-6666
List Price: \$1,535

CIRCLE 854 ON READER SERVICE CARD

Selecto-Switch, Model 5410

Giltronix
3780 Fabian Way
Palo Alto, CA 94303
(415) 493-1300
List Price: \$220

CIRCLE 863 ON READER SERVICE CARD

The Print Director, Model MS 1

Digital Products, Inc.
600 Pleasant St.
Watertown, MA 02172
(800) 243-2333
List Price: \$1,295

CIRCLE 862 ON READER SERVICE CARD

ShareSpool

Extended Systems
6062 Morris Hill Ln.
Boise, ID 83704
(208) 322-7163
List Price: \$595

CIRCLE 861 ON READER SERVICE CARD

Get up to speed for under a hundred bucks.

If you're writing in the BASIC that came with your IBM® PC, now you can make your programs scream. Microsoft's new QuickBASIC Compiler will punch you right into warp speed, accelerating your programs by as much as ten times. And all with hardly any code changes.

You get all this at a price that won't slow you down, either. Just \$99 and you're in.

The new QuickBASIC Compiler was designed to work with the

CIRCLE, PSET, and COLOR.

So your graphics and music routines will look and sound as they should.

And when you're ready to move into structured programming, QuickBASIC also offers language extensions for a speedy transition. With optional alphanumeric labels you can make your programs more readable. And compiled subprograms will save you time.

So get moving. **MICROSOFT.**
Call us now for The High Performance Software® more information on the QuickBASIC Compiler and the name of your nearest Microsoft dealer. Just ring (800) 426-9400. In Washington State, Alaska, Hawaii and Canada, call (206) 828-8088.

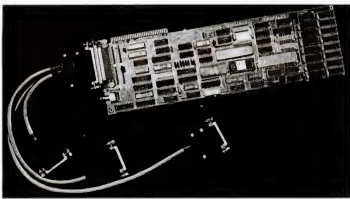
Then go give your programs a swift kick.



programs you've already written. It supports all BASIC sound and graphic statements including PLAY, SOUND, LOCATE, DRAW, GET, PUT, LINE,



PRINTER SHARING



The ShareSpool from Extended Systems allows three PCs to share a single printer.

As with the Hadax models and other switchers, this device operates on the simple FIFO principle (first in, first out). It has no buffer memory, so, once again, a spooler is necessary if you want to free your computer for other work while waiting for a printout.

Just for fun, I split the output port of the Selecto-Switch in two by attaching it to the Hadax parallel AB switcher. This resulted in a manually switched printer-sharing system for three computers with a choice between two printers. It is far from ideal, but it is useful.

ShareSpool

ShareSpool, a board with 64K buffer memory from Extended Systems, is dedicated specifically to sharing a single printer among three PCs. You install the board in any full-length expansion slot in one of the computers, which is called the host. Then you plug a special arrangement of three joined cables into the board: one cable goes to the printer and the other two go to the parallel ports of the other PCs, called slaves.

The beauty of the ShareSpool printer-sharing system is its unobtrusive nature. You can't see or touch it, and you don't have to make any adjustments once you have installed everything.

The installation does have one tricky part: you must disable your current parallel port so that ShareSpool takes its place. On a multifunction board, such as the ones in the PCs I used for testing, this means

changing a jumper, but only on the host computer. Once you install the board, disable your active parallel port, and plug in the cables to the printer and PCs, you can forget it's there and everyone can send documents to the printer at will.

The buffer memory on the board stores incoming data and puts subsequent files in queue for printing, freeing the host and slaves to work on other tasks. ShareSpool regulates output strictly on a first-come, first-served basis.

I can't say any more about this system because that's all there is to it. It has no menus, no blinking lights, and no switches. Of course, its limitations are built-in; if

you want more than three PCs using more than one printer, you must cascade or chain several ShareSpool units together.

Interfazer

Quadram's Interfazer is an intelligent peripheral controller and memory buffer with many uses, including printer sharing. The chunky 6-inch high \times 14-inch wide \times 9-inch deep box comes with up to ten ports in any configuration of serial and Centronics parallel and up to 128K buffer memory installed on two separate boards. It can control up to eight computers sharing two peripherals—printers in this case. The price listed in the Fact File, \$1,535, is for the unit I tested, which has five serial ports, five parallel ports, and 128K buffer memory.

In general, the 12-page manual makes the installation and operation sound simple, and if you plug things into the proper ports, the Interfazer is indeed easy to run. But the manual doesn't offer a lot of detail, unfortunately. In fact, it doesn't even make it clear that you *can't* simultaneously run two printers.

To install the Interfazer, you remove four screws and its top cover and set the baud rate and input/output for each individual port. Quadram has made this operation as simple as it could possibly be. You select the baud rate by turning a dial on each serial port board. You regulate input/output with an up/down switch that is con-



Quadram Corp.'s Interfazer is able to accommodate many PCs and two printers but cannot handle simultaneous output.

New Version

Sizzling C.

The fastest C. The C that Microsoft developed to write its own software programs. Hot.

So hot that we can make this claim: Virtually every program runs faster with Microsoft® C Compiler than with any other MS-DOS® C compiler.

Efficient C.

We give you everything you need to write code so tight your computer will scream.

"Preliminary testing on the Microsoft C Compiler produced code that was significantly smaller than that produced by other C compilers."

Paul Springer, Ashton-Tate.

"We found the FAR pointer very helpful for situations where a mix of memory models offers the greatest efficiency."

Robert Frankston, Software Arts.

"The portability of the code between MS-DOS and XENIX® is great."

Jim Bean, Peachtree Software.

But it's really no surprise that our C stretches your micro to its limits. We wrote both the MS-DOS and the XENIX operating systems.

For the name of your nearest Microsoft dealer, or to upgrade from Microsoft C Compiler or Lattice C, **MICROSOFT.** call (800) 426-9400. The High Performance Software®
In Washington State, Alaska, Hawaii and Canada, call (206) 828-8088.
And make your programs really cook.

Microsoft C Compiler Version 3.0

Microsoft C Compiler

- Produces compact code and fast executables.
- Implements register variables.
- Small, Medium and Large Memory model Libraries-Mix models with NEAR and FAR pointers.
- Transport source and object code between MS-DOS & XENIX operating systems.
- Library routines implement most of UNIX System V C library.
- Choose from three Math libraries and generate in-line 8087/287 instructions or floating point calls.
 - Floating point emulator (utilizes the 8087/287 if installed).
 - 8087/287 coprocessor support.
 - Alternate math package—extra speed on systems without an 8087/287.
- Link routines written in Microsoft FORTRAN (V 3.3 or higher), Microsoft Pascal (V 3.3 or higher) or Microsoft Macro Assembler.
- Supports MS-DOS pathnames and Input/Output redirection.
- File sharing and record and file locking is supported.
- Do source level debugging, with the Symbolic Debug Utility, available separately with the Microsoft Macro Assembler Package.

Library Manager

Create, organize and maintain your object module libraries created with Microsoft languages.

Object Code Linker

- Simple overlay linker combines relocatable object modules created using Microsoft Languages into a single program.
- Link very large programs (over 1MB, using overlays).

EXEPAK Utility

A new utility to compress sequences of identical characters from an executable file and to optimize the relocation table.

EXEMOD Utility

A new utility used to modify the fields in the header according to the instructions given by the user in the command line.

'C' Benchmarks—done on a Compaq Plus with 512k memory with no 8087. Program 'SIEVE', with register variables.

	Exec Time	Code Size	EXE Size
Microsoft C	:9.39	141	5,914
Lattice C	:12.24	164	20,072

*Purchase both Microsoft C Compiler and Microsoft Macro Assembler and get a \$25 rebate direct from Microsoft. See package for details.

Microsoft, MS-DOS and XENIX are registered trademarks and The High Performance Software is a trademark of Microsoft Corporation.



PRINTER SHARING

veniently located in plain view.

However, this input/output switch makes no sense; out of the ten available ports, only the ninth and tenth (the last two) can be output ports. All of the others are input. Therefore, why do the boards for those ports have switches for input/output when they can only be set as output? Even the Quadram representative couldn't answer that one. I tested the unit with three PCs and two printers, all plugged into the parallel ports. I plugged the printers into slots 9 and 10 and set those ports as output and the other three as input. I did not use the serial ports, so I didn't bother with the baud rate settings.

The front panel presents an on/off switch, a reset button, and an LED for each port. The unit has its own power supply, and upon powering up, the lights flash in sequence while the Interfazer checks for connected ports. If everything checks out, a Ready lamp lights. If not, the Error lamp lights.

Because I experienced no error conditions during the testing, the unit came up ready to work. I issued print commands from each of three PCs, figuring that output from the first PC would go to the default port (9—the dot matrix) and that output from the second would go to the daisywheel. I expected that output from the third PC would go to whichever printer finished first.

My expectations were not fulfilled. All

three PCs were immediately free to work on other things because their documents were stored in Interfazer's buffer memory, but the second printer remained silent. All three documents were printed sequentially, in the order I had given their print commands, on the same printer. But this wasn't what I had in mind. According to

The Interfazer works best if you're planning to share just a single printer or two identical printers to back each other up during paper, ribbon, ink, or cartridge changes.

skimpy information in the manual about Interfazer's priority systems, when the unit detects a "not ready" signal from the default output port, it redirects output to the other port. This information is what led me to believe the unit would perform simultaneous output to both printer ports. As it turns out, the "not ready" light means the printer is off line or its power is turned off.

Therefore, you can use more than one printer but not without problems and not simultaneously. Because the Interfazer has your documents queued in memory wait-

ing to be printed, there's not much delay between print jobs. But, if you want to change printers for the next document to be printed, you have to stand by and be ready to turn the active printer off line the moment it finishes printing its document. A Quadram representative confirmed this conclusion. This is definitely not an ideal system.

The Interfazer works best if you're planning to share just a single printer or two identical printers to back each other up during paper, ribbon, ink, or cartridge changes. With eight potential users, the cost of an expensive high-speed dot matrix or laser printer is easier to justify, but eight users might crowd a single printer, even a fast laser.

It's too bad the Interfazer does not support multiple simultaneous output. It has the boards and the "brains," but not the talent.

The Print Director, Model MS 1

The Print Director, Model MS 1, from Digital Products is a handsome standalone unit, about 1 foot square and 5 inches high with a row of LEDs across its front panel. Of all the products I tested, this one comes closest to the ideal external system. My test model was fully configured with four serial ports and three parallel ports, accommodating up to four PCs and three printers. What's more, The Print Director can control up to 63 separate print jobs with its buffer, and it supports simultaneous printing as well.

I tried connecting three PCs to the serial ports and two printers to the parallel ports, but since this setup wouldn't run under Print Director's factory defaults, I had to reconfigure. You can do this in two ways: from a screen menu accessed with communications software (*Crosstalk*, for example) or from the front panel.

The screen menu is certainly the easier method, so I decided to try the hard way—the front panel—just to see if it worked. You have to set seven registers for each port: 1. printer or computer, 2. graphics or normal mode, 3. cascade or normal mode, 4. baud rate (for serial ports), 5. Xon/Xoff or ready/busy protocol, 6. carriage return and line feed or just carriage return, and 7. DCE or DTE, depending on whether the equipment that you are using is data com-



The Print Director, Model MS 1, from Digital Products comes fully configured with all the ports you'll need, including four serial ports and three parallel ports.



**Get prompt relief
from the primary cause of
computer anxiety.**

LaserJet Printing with WordStar® and Lotus 1-2-3®

Polaris PrintMerge™ is a print control program that prints WordStar and ASCII print files like Lotus 1-2-3. By using Polaris PrintMerge™ you can create simply the best most professionally perfect printing possible by the LaserJet. Camera ready Documentation, Proposals, Spreadsheets, Reports, Manuals and Newsletters are all quickly and economically printed with that *we really care appearance*. Here's what others are saying about Polaris PrintMerge™.

- ★ InfoWorld Review "POLARIS PRINTMERGE TAKES THE WORRY OUT OF USING THE HP LASERJET EFFECTIVELY WITH WORDSTAR AND 1-2-3. Do we like Polaris PrintMerge? **YOU BET.**" (6/10/85)
- ★ John C. Dvorak, InfoWorld & PC World Columnist gave an unqualified plug to the program saying: "I highly recommend it" (4/1/85).
- ★ Recommended by Hewlett Packard

Print any font Anywhere ★ Anytime ★ Micro Justified ★ Centered

In Columns ★ Lines & Boxes ★ Integrate Charts & Text ★ Merge Files & Text

Paragraph Reformatting of Proportional Fonts ★ Supports All 15 Font Cartridges



Call or Write for Your Copy Today 619 471-0922
310 Via Vera Cruz, Suite 205, San Marcos, CA. 92069

PC or MS DOS 100K RAM IBM PC, XT, AT, or 100% Compatible & 128K RAM HP 150

\$ 99.00 copy protected
\$ 124.00 not copy protected
Money Back Guarantee

CIRCLE 132 ON READER SERVICE CARD

Is there an XEDIT compatible editor for your IBM PC? Yes. KEDIT.

- Most XEDIT commands and features
- XEDIT fullscreen layout
- Multiple files
- Splitscreen editing
- Redefinable keys
- Enhanced block operations
- DOS command interface
- And much, much more

Mansfield Software Group
Box 532
Storrs, CT 06268
203-429-8402

\$125 plus \$3 shipping
Demo Version \$10
MC, VISA, COD, PO, check

XEDIT is IBM's powerful fullscreen editor for VM/CMS

CIRCLE 379 ON READER SERVICE CARD

PRINTER SHARING

munications or data terminal.

I set the registers by turning on and off combinations of the LEDs on the front panel with their push buttons. Unfortunately, there is a lot of room for error in this front-panel method of configuration. While it is meant to be a convenience because you don't need communications software and don't have to exit the program you're working on, I recommend

It doesn't matter what
type of equipment you
want to use in your
printer-sharing system
because you can set The
Print Director's
variables to accept
almost any device.

you use the screen menu system, which can be accessed by any computer or terminal hooked to The Print Director.

The number of factors in the configuration process may sound like a lot of fussing around, but what they yield is the most flexible printer-sharing system available. It doesn't matter what type of equipment you want to use in your printer-sharing system because you can set The Print Director's variables to accept almost any device. You can mix micros, minis, and mainframes with printers and plotters. The Print Director only cares that you correctly configure the ports and equipment.

Based on the requirements of my test equipment—three PCs, a dot matrix, and a daisywheel printer—I had to make three changes to the configuration. I had to define the five active ports as either computer or printer (input or output) and change the baud rates for the computers to 9600. And I switched one port from DCE to DTE. The other parameters that had been set at the factory didn't need to be changed.

Once I reached the desired configuration for the three PCs and two printers being tested, I was able to write that information into The Print Director's nonvolatile memory by simply pushing a reset switch on the rear panel. To test the configuration in memory, I turned the unit off and then



With SummaMouse[®] and GEM[™] software, you'll never get lost in DOS again.



You know the feeling. Panic sets in as you stare at the dreaded A> prompt wondering, "Now what?"

Here's what! Now you can cure this condition with SummaMouse and GEM software. The hardware and software team that makes the IBM[®] PC so friendly it's downright huggable.

GEM software is the graphics environment that's sparking interest everywhere. And SummaMouse makes it sparkle plenty. It's made by Summagraphics, a company that's been in the computer graphics business as long as there's

been a computer graphics business.

We're packaging our state-of-the-art electronic mouse with the GEM Collection[™]. So you can write, paint and organize your desktop with the wave of a hand. And the click of a button.

But that's not the half of it. We're bringing out a whole line of products. Including SummaSketch[®], a PC-sized version of the digitizers we put on six-figure CAD systems. Available in two sizes, SummaSketch will be packaged with GEM Draw[™]. And of course, SummaSketch and SummaMouse are also

available separately.

Think of it. Freedom at last from the tyranny of DOS. SummaMouse and GEM software are good for what ails you. For the dealer nearest you, call (203) 384-1344, or write Summagraphics Corporation, 777 State Street Extension, P.O. Box 781, Fairfield, CT 06430.

Summagraphics[®]
CORPORATION
Draw on our experience.

SummaMouse and SummaSketch are registered trademarks of Summagraphics Corporation. IBM is a registered trademark of International Business Machines Corporation. GEM, GEM Collection and GEM Draw are trademarks of Digital Research Inc. Color available with IBM Enhanced Graphics Adapter and compatible color monitors only.

ITT INTRODUCES THE FASTEST PC IN THE WORLD. BECAUSE TIME IS MONEY.



The faster you can do a job, the faster you can do another. And the more jobs you do, the more money you make.

A simple business principle around which we've craftily designed the ITT XTRA[™] XP.

A personal computer bursting with the speed and power you need to move ahead and stay ahead. Over three and a half times faster and fully compatible with the IBM XT. Twenty-five percent faster than the AT. And twenty-five percent faster than the AT on a Lotus recompetition.

Example. A spreadsheet

that once took 32 seconds to compute now takes a mere 9 seconds.

Time savings for other business tasks are equally staggering.

Imagine all the extra muscle of the 80286 Intel microprocessing chip conveniently packaged in a very small space.

And imagine the very same tilt-and-swivel monitor, built-in telecommunications port, IBM compatibility and the host of other computer niceties that have made the whole family so successful.

Now stop imagining. And start dialing.

Call (800) 321-7661, or in California, (800) 368-7300 today.

We'll tell you your nearest ITT authorized dealer of the fastest PC in the known world.

The ITT XTRA[™] XP.

And call quickly. Before the rest of the business world passes you by.

Faster than you can imagine.

ITT
PERSONAL COMPUTERS

HELPING AMERICA WORK SMART.

© 1985, ITT Systems, Inc.IBM XT and AT are registered trademarks of International Business Machines. Intel 80286 is a registered trademark of Intel Corporation. The new ITT XTRA-XP is scheduled to be available summer of 1985.

CIRCLE 299 ON READER SERVICE CARD

PRINTER SHARING

back on again before proceeding.

The Print Director gives you maximum flexibility in establishing a data path between any input and output port. In my initial test, I gave the command to print from all three computers without specifying where the output should go. The document from the first computer began to print on the dot matrix, and front-panel LEDs showed those two ports were active.

The real beauty of The Print Director is that you can direct output to any attached printer by sending a code at the top of the file. The code is a tilde and the name of the port to be used.

The Print Director sensed the busy dot matrix port, so the document coming from the second computer was automatically routed to the daisywheel. The document from the third computer had nowhere to go, so it sat in The Print Director's buffer memory, waiting for one of the printers to finish its current job. Because the daisywheel finished first, the queued document was printed on it.

However, the real beauty of The Print Director is that it allows you to direct output to any attached printer simply by sending a code at the top of the file. The code consists of a tilde (~) followed by the name of the port you wish to use. You can give the ports any name you like if you configure the unit from its screen menu. In this manner, each computer operator can select the printer to be used for each document with little fuss.

The Print Director comes in many configurations and with any number of serial and parallel ports, and includes a standard 60K buffer memory. You can increase this buffer memory to 512K, but it's expensive, literally doubling the cost of the unit I tested.

Each of these five printer-sharing devices has its own advantages for particular applications or situations. T-switchers are inexpensive and require very little work

You erased your PC's data. Get it back with The Norton Utilities.™



Peter Norton has been rescuing PC data since he first wrote The Norton Utilities in 1982.

It happens. Maybe you're working too late. Maybe your PC's keyboard is looking like unfamiliar territory. Press delete when you don't mean to and a whole week's worth of input data is history.

The Norton Utilities are powerful organizational tools designed for the IBM PC and DOS compatibles. With a remarkable file recovery feature called UnErase, you can actually search for and restore lost data with a few simple commands.

The Norton Utilities are great for daily disk management tasks, too. You can locate files, track down data, and put disks in order. You're organized! And with UnErase, you're insured against costly mistakes.

TIME-LIFE ACCESS NEWSLETTER says "Highly recommended for business users."

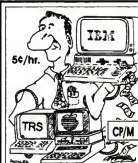
THE NORTON UTILITIES
DATA RECOVERY
DISK MANAGEMENT

Santa Monica, CA 90403. 213-399-3948. Visa and Mastercard welcome.



A life saver for your data.

CIRCLE 346 ON READER SERVICE CARD



TRS	To	IBM PC/XT	149.95
Apple		Tandy 1000, 1200, 2000	149.95
CP/M		IBM AT	224.95
IBM PC	(To/From)	Tandy 2000 Disk Transporter	129.95



■ PERSONAL
■ COMPUTER
■ PRODUCTS

3080 Olcott Dr. Ste. 1308, Santa Clara, CA 95051 (408) 988-0164

FILE TRANSFER + Conversion Utilities

Transfers: (no more retyping)

- Visicalc, Multiplan
- Data Files, ASCII Files
- Word Processing Files
- Basic, Fortran, Cobol

TRANSFER SERVICE:
Call for Information

Disks (Top Quality)	DS/DD	89¢ ea./100
All Products		
Drives 360 KB	265.00	149.00
CMI 40 Meg.	1150.00	1014.00
128K Ram Set	145.00	105.00
Prototype Board & Extender Cards		120/ea.
High Capacity Disks	540.00	535/10

Phone Orders: MCA/ACQUISITION
800 621-0854 Ext. 167

CIRCLE 102 ON READER SERVICE CARD

NO MATTER WHY YOU BOUGHT YOUR COMPUTER...



WE BRING YOU NEW APPLICATIONS.

Every month, *CREATIVE COMPUTING* carefully researches, tests, and reviews all new software—ranging from word processing and spreadsheets to educational programs. With *CREATIVE COMPUTING* you'll make the right decisions about software, whether you choose one of the major packages—or one from an innovative manufacturer.

No matter why you bought your computer, stay in the know with *CREATIVE COMPUTING*.

Subscribe to *CREATIVE COMPUTING* today and save 50%!

FOR FAST SERVICE CALL 1-800-852-5200 TOLL FREE

Creative Computing

P.O. Box 5214
Boulder, Colorado 80322

- ☐ Please accept my subscription to *CREATIVE COMPUTING* for 1 year (12 issues) at only \$12.49. I save 50% off the regular subscription price of \$24.97!

Mr./Mrs./Ms. _____ (please print full name)

Company _____ Title _____

Address _____

City _____ State _____ Zip _____

Check one: ☐ Payment enclosed ☐ Bill me later

Charge my: ☐ American Express ☐ Visa ☐ MasterCard

Card No. _____ Exp. Date _____

Please allow 30 to 60 days for delivery of first issue

10744

PRINTER SHARING

and almost no technical savvy to install. And their operation is foolproof if the computers are in the same room. An expansion card, such as ShareSpool, removes the system from sight and doesn't require any action from its operators. But it eats up an expansion slot in the host computer, handles just three computers, and offers only one printer output. The Interfazer accommodates plenty of PCs and two printers,

You have to decide if printer sharing makes sense for you. If you end up spending as much for a device as you would to provide individual users with their own printers, is it worth it?

but not simultaneous output or any method of directing output to a printer from the operator's computer.

All in all, I have to place The Print Director at the head of its class. It can establish any computer-printer connection from individual computers. In addition, it does not restrict the types of cables, computers, and output devices because you can accommodate any equipment from the configuration menu or front panel. And you can connect up to four Print Director units, yielding a printer-sharing network for up to 21 computers and six printers.

Ultimately, you have to decide if printer sharing makes sense for you. If you buy a T-switcher and end up arguing with other users for priority, what's the point? If you end up spending as much for a device as you would to provide individual users with their own printers, is it worth it?

Don't rush into buying a printer-sharing system without considering both emotional and financial criteria. Printer sharing can help you justify your equipment costs and reduce the headaches of reconfiguration when you want to change printers, but everything depends on your particular situation. ■

Phil Wiswell is a frequent contributor to PC Magazine.

BEFORE YOU GET ON THE WRONG TRACK, READ THIS ABOUT THE ONLY ROM-BOOTABLE, PLUG-COMPATIBLE, XENIX SUPPORTING, HEAD-CRASH PROTECTED, HIGH-PERFORMANCE HARD DISK UPGRADE KIT FOR YOUR IBM PC-AT.

Atplus™

Recording Media
99.94% error free unformatted
100% error free formatted
Maximum destination is
10Kb/MB

Up to 30% faster
than IBM's drives.
Exceeds IBM's specification
for AT high-performance
hard disk. Average Access
30 @ 30 MB; 19ms
40, 56, 72 MB 28 ms

Bootable ROM supports
DOS and XENIX
Only from CORE.

Rotary Voice Coil (RVC)
R/W head positioner
Fast and Accurate

Atplus drives are
manufactured
for CORE by
Full one year warranty.
Service available worldwide
(drive shown with cover removed)

Automatic Park & Lock (APL)
Senses power interrupt, retracts
heads to safe landing zone. Heads
never land on data, virtually
eliminating risk of data loss.

Memory option.
16 x 128 Kilobits (150w) D-RAM
chip set. Adds 256 KB to PC-AT.
Basic model making 512KB PC-AT.
With AT plus drive, you can
build the PC-AT IBM should have
built in the first place.

THE BALANCING ACT OF 1985

You didn't buy an IBM PC-AT just to balance your checkbook. You bought it to crunch lots of numbers and words, in the shortest possible time. A labor saver. A time saver. Hence, a money saver. So, do your part for effective money management: hard disk storage is no place to be penny-wise and pound foolish.

TELL 'EM YOU NEED HIGH SPEED AND DATA PROTECTION.

These and other important features do add cost, but that makes a premium drive. Anything that can be made, can be made cheaper, sell for less, offer lower performance, and probably die young.

Remember, usually you get what you pay for, and you ALWAYS get what you don't.

ALL HARD DISKS ARE NOT CREATED EQUAL.

There are vast differences in the speed and reliability of Winchester hard disks. Since the IBM PC-AT is an incredibly fast machine, a slow drive can make an AT run like an XT.

So, before you get stuck with a slow drive in your AT, save your boss two grand and buy an XT.

Or better yet, buy the AT and avoid any drive with access Times over 40 milliseconds.

RELIABILITY: WHERE HAS ALL THE DATA GONE?

Now tell 'em the drive must have a data protection scheme. One that's easy to use and reliable. Winchester heads read and write while "flying" a few microns above the data surface. If the heads contact the recording media, you risk a head crash, and significant or total data loss.

So, even a fast drive without data protection is virtually worthless. Frankly, we'd rather sleep at night.

BEWARE OF USER-DEPENDENT PROTECTION SCHEMES.

Some drives have a safe landing zone for the heads, but you need to call a separate program to send 'em there. If you don't call that program, and most folks won't, the heads in these drives ALWAYS land on data when powered down.

The slightest bump or vibration can move the heads, wiping out those data tracks. And the R/W heads can become contaminated, thus increasing the error rate, slowing down average access until the whole drive fails.

Consequently, those drives offer a very high risk of head crashes, a false sense of security, and little else.

What's your data worth? \$200? \$400? Specify AUTOMATIC data protection. Atplus has it. And it doesn't cost, it pays.

PEACE OF MIND.

Specify AUTOMATIC park and lock of the heads on power down.

This system provides unparalleled head crash protection, by sensing power loss to the drive, and retracting the heads to a dedicated landing zone before they can land on your data.

Since this is 100% automatic, user-dependent risk is eliminated.

OUR DRIVES HAVE ALL BEEN TO BOOT CAMP.

Avoid drives that CLAIM PC-AT compatibility but can't BOOT the AT. By the time you juggle the

diskettes necessary to use one of those drives, the phrase "user-hostile" may have deep personal significance.

We believe that computers ought to serve people, not the other way around.

BEWARE OF THE BARGAIN BAND-SCHLEPP.

Avoid drives with inexpensive Band-Stepper positioner technology. These were pretty good way back in 1980, considering that's all anyone had. But by today's standards, they're inaccurate and very mechanical.

They waste time looking for the right track to read or write. And they're worth no where near the price you'll pay for 'em—in more ways than one.

THE HIGH TECH SOLUTION.

Specify state-of-the-art ROTARY VOICE COIL (RVC) head positioner and CLOSED LOOP SERVO technologies.

This system uses a DEDICATED SERVO SURFACE (DISS) for continuous head location information.

The RVC and DISS use a large scale microprocessor to translate new track-look commands into current that is applied directly to the RVC.

This moves and holds the R/W heads at the exact track intended.

Speed is dramatically increased since head movement is created electronically, with minimal mechanical interfacing.

BEWARE OF THE SOLE SOLUTION.

Specify names you know and can trust. Like Control Data Corporation, a world leader in hard disk technology. And CORE INTERNATIONAL, a growth company with over ten years in computer technology, design and manufacturing.

ATPLUS: IDEAL FOR THE SPEC MANIAC.

Atplus High Performance Hard Disk Upgrade kits, available in 20, 30, 40, 56, and 72 MB capacities.

They have ALL the above features and none of the shortcomings of "bargain" drives.

And your AT will accept any two Atplus drives for up to 144MB of bootable, reliable, DOS and XENIX supporting high-performance on-line storage, all inside the box.

TELL YOUR DEALER...

That only Atplus Hard Disk Upgrade Kits from CORE will do. If he or she doesn't have 'em, we'll gladly send them up as Atplus authorized dealers.

CORE INTERNATIONAL

542 S.E. 5th Avenue • Delray Beach, Florida • 305/276-3929



BEST FRIEND

Makes PC-DOS Easy To Use!

Best Friend™ rescues you from cryptic DOS commands with easy to use menu selections for disk and file operations, printer output redirection, "pop-back" features and more.

Disk and File Services

- Copy, Delete, and Rename Files
- Find, View, and Print Files
- Change File Attributes (Make hidden files)
- Sort files and directories using up to two keys
- Tag files for group copy and delete operations
- Format and Copy Disks
- Make and Remove Sub-directories
- Change Disk Volume Label Names

Scientific/Business Calculator

- Over 40 math and business functions
- Printable on-screen tape display

Electronic Typewriter

- Straight type-thru and line edit modes
- Automatic word wrap and margin controls

Printer Output Redirection

Capture the printer output (even "Print Screen" data) from any program into a disk file.

Pop-Back Feature

Use Best Friend even while running another program. "Pop-Back" to Best Friend from all your favorite programs.

System Requirements (Not copy protected)

Best Friend can be obtained as one memory efficient program (uses 126K) or any one function may be obtained as a stand alone program. Best Friend and family will operate on an IBM/PC, XT, AT or true PC compatible. In addition, the File Services and Printer Output Redirection functions are available for most computers using CP/M-80™, CP/M-86™, and MS-DOS™.

Best Friend is a TM of Elite Software Development, Inc. IBM and PC DOS are registered TMs of International Business Machines Corp. CP/M-80 and CP/M-86 are TMs of Digital Research, Inc. MS-DOS is a TM of Microsoft Corp.

Elite Software Development, Inc.
P.O. Drawer 1194 Bryan, TX 77806

Available at better dealers nationwide or call Elite Software at 1-800-648-9523, Texas 409-846-2340

Carefully Describe your Computer System!	Best Friend (Full version)	\$84.95
Mine is _____ 8 bit _____ 16 bit	Best Friend (Demo version)	\$14.95
I Use _____ PC-DOS _____ MS-DOS	(Functional, with limitations)	
_____ CP/M-80 _____ CP/M-86	Typewriter only	\$39.95
My computer's name/model is _____	Calculator only	\$39.95
	File Services only	\$39.95
The disk size I use is _____	Printer Output Redir. Only	\$49.95
<input type="checkbox"/> 3 1/2" <input type="checkbox"/> 5 1/4" <input type="checkbox"/> 5"		

*Add \$4 for shipping and handling to US cities. Add \$10 per product for foreign orders

Name _____

Shipping Address _____

City _____

State _____ Zip _____

Telephone _____

Amount (TX 6% tax) _____

Payment VISA MC BankDraft Check

Credit Card Exp. Date _____ / _____

Card # _____

COD's and Purchase Orders WILL NOT be accepted by Elite Software. Texas residents add 6% sales tax. Outside USA add \$10 and make payment by bank draft, payable to US dollars drawn on a US bank.

**Immediately Available –
Large Quantities**

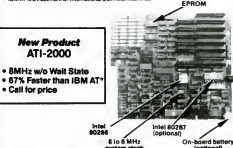
The ATI-1000... presented by ATI

IBM AT* Compatible Motherboard

- Up to 640-kb main memory (1Mb on-board optional)
- 8 I/O Slots
- Same Dimensions as IBM AT* (12 x 13 inches)

Suggested OEM price \$1,095. (orders of 10 units or more); volume discounts available.
Also available: Power Supplies, Cases and Keyboards.

*IBM AT is a trademark of International Business Machines



New Product ATI-2000

- 8MHz w/o Wait State
- 67% Faster than IBM AT*
- Call for price

ATronics International, Inc.

520 Valley Way • Milpitas, CA 95035 • (408) 943-5629 • (408) 263-6533

CIRCLE 155 ON READER SERVICE CARD

PRINTERS USED TO BE BLA BLA BLA. NOW IT'S BLAHA! \$99 FOR EASY TO USE LASER PRINT

A complete document creation tool for the HP LaserJet. Lets you access all features with easily learned commands. It works with any word processing editor on IBM PCs and PC Compatibles. **NOT COPY PROTECTED.**

- Over 100 Simple Commands.
- Easy Font Selection and Formatting.
- Quickly Adapt Documents for Printing.
- Do All Your Printing In-House.
- Works With Spreadsheets, Database Report Generators, and Other Software.
- Easy Design Of Logos, Fonts, Diagrams.

ENHANCED GRAPHICS VERSION \$199
Offers All the Above Plus Form Generation with Boxing & Shading (11 Types of Shades). Graphic Features for Creating Artwork, and Diagrams with Simple Commands for Circles, Disks, Ellipses, and Ovals in Varying Thicknesses and Shades. Exploit the Full Capabilities of the LaserJet.

NEW CANON LASER BEAM VERSION \$199
Offers Complete Access to All the Page Typesetting Features of the Canon Laser Printer. Laser Print can Generate Forms with Boxing, Shading, Page Overlays, Character Enlargement, Easy Font Selection, White on Black Printing, and Shaded Printing.

BLAHA SOFTWARE - JANUS ASSOCIATES
Suite 701, 50 Commonwealth Ave., Boston, MA 02116.
(617) 236-1892 MC/VISA.

CIRCLE 103 ON READER SERVICE CARD

Double Duty Directory Display

DDIR is an assembly language utility that displays normal directory information in two columns and alphabetizes the listing.

The more you need DIR to list large numbers of files, the more obvious its basic limitation becomes. By using only 39 display columns per line—a concession to terminals that few, if any, PC owners use—DIR wastes half its 80-column display space and can show you only 25 files at once. The only provision DOS makes for putting more files on the screen is the DIR/W option, and this leaves out the important size, date, and time information.

DDIR, which stands for "Double Directory," is an assembly language utility designed to make your directory listings more useful. It displays all the normal directory information in two columns, thus giving you more directory information per screen. It also automatically alphabetizes the listing and pauses after every full screen.

DDIR.COM is not intended as a wholesale replacement for DIR.COM. Rather, it simply intercepts the normal DIR information on its way to the display, sorts it, and puts it in two columns instead of one. Thus, DDIR will accept any drive, path, or filename parameter that would be accepted by DIR alone. The program requires PC-DOS 2.0 or above and, as you'll see, takes advantage of some of the more esoteric features of DOS.

Getting DDIR

The easiest way to get a copy of DDIR is to download it via modem from the PC Interactive Reader Service at (212) 696-0360. If your communications software supports the Xmodem protocol, you can download DDIR.COM directly. If not, you can still download DDIR.ASC, RE-

1985/No. 20

Name it as DDIR.BAS, load it into BASICA, and run it. This will create the DDIR.COM file ready for use.

If you have the IBM Macro Assembler, you may prefer instead to download `DDIR.ASM` and assemble it yourself. It's in the `.COM` file format, so you'll have to run `EXE2BIN` after `LINK`. Even if you don't have the Macro Assembler, however, getting the `DDIR.ASM` file will be helpful in following the discussion of the program below.

The Big Picture

To understand how DDIR operates, it's a good idea to step back and look at the big PC-DOS picture. Any disk formatted with the /S option contains the three files that comprise PC-DOS. Two of these are hidden files; the third, **COMMAND.COM**, is visible in a directory listing.

The two hidden files are called IBM-BIO.COM and IBMDS.COM. In PC-DOS 2.0 and above, IBMIO is basically a series of device drivers. These drivers provide a means for PC-DOS to communicate with the hardware of the PC, including the display, the keyboard, the disk drives, and the printer. In many cases, these IBMIO.COM device drivers use the ROM BIOS interrupts.

IBMDOS.COM contains the code needed to execute the DOS function calls. You use IBMDOS.COM every time you issue an Interrupt 21h in an assembly language program. If a particular function call needs to use a hardware device, it then calls a device driver routine in IBMBIO

ORDER TOLL FREE
24 HOURS EVERY DAY
800-662-2686

SPECIALS

Rbase 5000	359
Multimate	219
Pop-Up Desktop w/Telecomm	79
Energistics w/Plot Option	239
Epson FX-185	469
Epson DX-10 Datsywheel Printer	229
Hayes Smartmodem 1200B	349
Tecmar Captain w/286	239
Amdek Color 700	439
Everex 20 MB Internal HD	689
Datashield 300 watt Backup Power	359

ACCOUNTING & FINANCIAL

Real World Accounting (per module)	38
Reachtree Business Accounting (per module)	29
ORA - Accounting System	40
Rags to Riches Plus (per module)	13
Star Accounting Partner 2	47
One Little Plus	17
Managing Your Money	10

—DATABASE

diase II	369	Reflex	29
PFS: File/Report Combo	149	Cornerstone	27
diase 4000	345	Cloud 2.0	19

SREADSHEETS & INTEGRATED SOFTWARE

Lotus 1-2-3	299	Symphony	411
Smart Mail System	449	Framework	369
Spreadsheet Auditor	65	Enroute	349

WORD PROCESSING

Microsoft Word ver 2.0	219	Word Perfect	229
Volkswagen Deluxe	149	Samina III	269
Peachtree 5000	149	Thinktank	99

GRAPHICS/UTILITIES/LANGUAGES

Microsoft Chart	149	Energygraphics	179
Graphwreiter Combo	369	ExecuVision	239
Autofrac v.1 (A.D.E.)	1349	Gems Draw	99
Norton Utilities	49	FontItz	99
CrossTalk	99	Remote	109
Spotlight	49	Gems Collection	119
Macro Assembler	95	Deq	129
Microsoft C Compiler	299	MS Cobol	409
Microsoft Pascal	179	MS Fortran	209
DS Assembler Plus Tools	139	Pascal MIT+	239
True Basic	99	Clascal	419

MODEMS & EXPANSION BOARDS

Smartmodem 2400	679	Smartmodem 1200	349
Teacar Phone Gate 2400	549	SmartCat +	299
Quadboard Exp. 384K	279	SafePlus 384K	309
Orchid Blossom 384K	279	PC Turbo 166	599
J-Ram 2 GB 246	from 169	STB Chatter	269
Parade Multiplex	199	Genoa Spectrum	309

PRINTERS

Epson LX-80	219	Epson FX-85	339
Epson 10-1500 Parallel	959	Epson DX-20	339
Toshiba 1340	569	Toshiba 1351	1219
Panasonic 1091	245	Panasonic 1092	449
NEC 2050	649	NEC 3550	999
Amdisk Color 500/710	329/559	Amdisk Video 310A	149

Call Toll Free 24 hrs Every Day
800-662-2686 orders only
 for Ca. Orders, Tech Support, Price Quotes, Info
415-668-9350 9-5 pacific time, m-f
 Call or Write for Free Catalog

MEMBERS: Visa, MasterCard, Discover, American Express, Personal Checks with 2 wk. term. Qualified ID's No fee for credit cards. Co. members add sales tax.
SHIPPING: UPS ground - 7% per order. \$4/min. FREE for 2nd order over \$1000. (ST) Rush 2% per order (3 min. FREE for 2nd order over \$1500). Printing, Minimums & Bulk Orders. 25 each.

All Products New with full warranties.
Price is obviously subject to change without notice.

THE BAY

THE  THE

BEST *Wine* BEST

PRICES SERVICE

COMPANY

COMPANY

584 CASTRO ST., SUITE 487, SAN FRANCISCO, CA 94111
a division of MCS, Inc./Computer & Software specialists since 1971

PROGRAMMING

.COM. Thus, there is a hierarchical structure to DOS: programs issue DOS calls to IBMDOS.COM, IBMDOS.COM issues device driver calls to IBMIO.COM, the device drivers issue interrupts to the ROM

BIOS, and the ROM BIOS talks to the hardware.

So where does COMMAND.COM fit in? COMMAND.COM is the program that is running when no other program is

running. It is COMMAND.COM that asks for the date and time when you boot up, displays the DOS prompt, reads in what you type at the DOS prompt, and searches to see if what you typed in is an internal

```

100 REM -- BASIC PROGRAM TO CREATE DDIR.COM
110 OPEN "DDIR.COM" AS #1 LEN = 1
120 FIELD #1,1 AS A$
130 CHECKSUM = 0
140 FOR I% = 1 TO 100
150     LINESUM% = 0
160     FOR J% = 1 TO 8
170         READ BYTE%
180         CHECKSUM = CHECKSUM + BYTE%
190         LINESUM% = LINESUM% + BYTE%
200         LSET A$ = CHR$(BYTE%)
210         PUT #1
220     NEXT J%
230     READ LINECHECK%
240     IF LINECHECK% <> LINESUM% THEN PRINT "Error in Line";299 + I%
250 NEXT I%
260 CLOSE
270 IF CHECKSUM = 77143 THEN PRINT "Successful Completion!" : END
280 PRINT "COM file is not valid!" : END
300 DATA 233, 161, 0, 40, 67, 41, 32, 67, 641
301 DATA 111, 112, 121, 114, 105, 103, 104, 116, 886
302 DATA 32, 67, 104, 97, 114, 108, 101, 115, 738
303 DATA 32, 80, 101, 116, 122, 111, 108, 100, 770
304 DATA 44, 32, 49, 57, 56, 53, 78, 101, 470
305 DATA 101, 100, 115, 32, 68, 79, 83, 32, 610
306 DATA 50, 46, 48, 32, 43, 36, 77, 101, 433
307 DATA 109, 111, 114, 121, 32, 80, 114, 111, 792
308 DATA 98, 108, 101, 109, 36, 67, 79, 77, 675
309 DATA 77, 65, 78, 68, 32, 80, 114, 111, 625
310 DATA 98, 108, 101, 109, 36, 67, 79, 77, 675
311 DATA 83, 80, 69, 67, 61, 0, 0, 0, 360
312 DATA 0, 0, 0, 123, 0, 0, 0, 92, 215
313 DATA 0, 0, 0, 108, 0, 0, 0, 0, 108
314 DATA 0, 0, 0, 28, 4, 0, 0, 0, 32
315 DATA 0, 0, 0, 0, 205, 205, 205, 205, 820
316 DATA 205, 205, 32, 80, 114, 101, 115, 115, 967
317 DATA 32, 97, 110, 121, 32, 107, 101, 121, 721
318 DATA 32, 116, 111, 32, 99, 111, 110, 116, 727
319 DATA 105, 110, 117, 101, 32, 205, 205, 205, 1080
320 DATA 205, 205, 205, 181, 180, 48, 205, 33, 1262
321 DATA 60, 2, 115, 9, 186, 38, 1, 180, 591
322 DATA 9, 205, 33, 205, 32, 191, 28, 4, 707
323 DATA 185, 112, 80, 176, 32, 252, 243, 170, 1250
324 DATA 187, 140, 85, 139, 227, 131, 195, 15, 1119

```

(continues)

Figure 1: The BASIC program to create DDIR.COM

command (DIR, COPY, ERASE, etc.). If so, it executes that command, often using lots of Interrupt 21h DOS function calls. If the typed command is not an internal command, then COMMAND.COM searches

the current directory for a .COM, .EXE, or .BAT file of that name, and then uses any directory paths set by PATH to do further searches. It is COMMAND.COM that loads in the file, and it is COM-

MAND.COM that takes over when the program is done.

COMMAND.COM is also responsible for executing batch file programs, including AUTOEXEC.BAT, when DOS is first

325 DATA	177,	4,	211,	235,	180,	74,	205,	33,	1119
326 DATA	186,	54,	1,	114,	218,	142,	6,	44,	765
327 DATA	0,	43,	255,	252,	38,	128,	61,	0,	777
328 DATA	116,	21,	87,	190,	85,	1,	185,	8,	693
329 DATA	0,	243,	166,	95,	116,	14,	42,	192,	868
330 DATA	185,	0,	128,	242,	174,	235,	229,	186,	1379
331 DATA	69,	1,	235,	179,	131,	199,	8,	137,	959
332 DATA	62,	93,	1,	140,	6,	95,	1,	140,	538
333 DATA	6,	97,	1,	140,	14,	101,	1,	140,	500
334 DATA	14,	105,	1,	140,	14,	109,	1,	184,	568
335 DATA	33,	53,	205,	33,	137,	30,	111,	1,	603
336 DATA	140,	6,	113,	1,	186,	119,	2,	184,	751
337 DATA	33,	37,	205,	33,	160,	128,	0,	4,	600
338 DATA	5,	162,	123,	0,	199,	6,	124,	0,	619
339 DATA	47,	67,	199,	6,	126,	0,	68,	73,	586
340 DATA	198,	6,	128,	0,	82,	14,	7,	187,	622
341 DATA	97,	1,	197,	22,	93,	1,	184,	0,	595
342 DATA	75,	205,	33,	140,	200,	142,	216,	142,	1153
343 DATA	208,	188,	140,	85,	156,	30,	139,	22,	968
344 DATA	111,	1,	142,	30,	113,	1,	184,	33,	615
345 DATA	37,	205,	33,	31,	157,	115,	6,	186,	770
346 DATA	69,	1,	233,	58,	255,	205,	32,	251,	1104
347 DATA	128,	252,	64,	116,	5,	46,	255,	46,	912
348 DATA	111,	1,	131,	251,	1,	117,	246,	156,	1014
349 DATA	80,	81,	86,	87,	6,	14,	7,	252,	613
350 DATA	139,	242,	46,	139,	62,	115,	1,	131,	875
351 DATA	249,	2,	117,	45,	129,	60,	13,	10,	625
352 DATA	117,	39,	46,	139,	14,	117,	1,	46,	519
353 DATA	199,	6,	117,	1,	0,	0,	46,	128,	497
354 DATA	62,	119,	1,	1,	117,	116,	184,	39,	639
355 DATA	0,	43,	193,	46,	1,	6,	115,	1,	405
356 DATA	46,	198,	6,	119,	1,	0,	235,	119,	724
357 DATA	144,	46,	1,	14,	117,	1,	46,	57,	426
358 DATA	14,	117,	1,	117,	77,	128,	60,	32,	546
359 DATA	117,	19,	46,	128,	62,	120,	1,	1,	494
360 DATA	117,	72,	232,	102,	0,	46,	198,	6,	773
361 DATA	120,	1,	0,	235,	61,	46,	129,	62,	654
362 DATA	121,	1,	16,	2,	114,	27,	81,	232,	594
363 DATA	81,	0,	46,	199,	6,	121,	1,	0,	454
364 DATA	0,	191,	28,	4,	46,	137,	62,	115,	583
365 DATA	1,	185,	112,	80,	176,	32,	243,	170,	999
366 DATA	89,	46,	198,	6,	120,	1,	1,	46,	507
367 DATA	198,	6,	119,	1,	1,	46,	255,	6,	632
368 DATA	121,	1,	46,	128,	62,	119,	1,	1,	479

(Figure 1 continues)

PROGRAMMING

369 DATA	116,	9,	7,	95,	94,	89,	88,	157,	655
370 DATA	233,	74,	255,	46,	139,	62,	115,	1,	925
371 DATA	243,	164,	46,	137,	62,	115,	1,	7,	775
372 DATA	95,	94,	89,	88,	157,	139,	193,	248,	1103
373 DATA	202,	2,	0,	83,	82,	86,	30,	14,	499
374 DATA	31,	191,	28,	4,	139,	14,	121,	1,	529
375 DATA	73,	227,	43,	81,	139,	247,	131,	198,	1139
376 DATA	39,	81,	86,	87,	185,	39,	0,	243,	760
377 DATA	166,	115,	16,	95,	94,	86,	87,	185,	844
378 DATA	39,	0,	38,	138,	5,	164,	136,	68,	588
379 DATA	255,	226,	247,	95,	94,	89,	226,	222,	1454
380 DATA	89,	131,	199,	39,	226,	213,	190,	28,	1115
381 DATA	4,	139,	14,	121,	1,	65,	209,	233,	786
382 DATA	187,	168,	3,	131,	249,	24,	115,	7,	884
383 DATA	184,	39,	0,	247,	225,	139,	216,	232,	1282
384 DATA	106,	0,	176,	32,	232,	76,	0,	176,	798
385 DATA	179,	232,	71,	0,	176,	32,	232,	66,	988
386 DATA	0,	3,	243,	131,	238,	39,	232,	83,	969
387 DATA	0,	232,	62,	0,	43,	243,	254,	6,	840
388 DATA	123,	1,	128,	62,	123,	1,	24,	116,	578
389 DATA	4,	226,	212,	235,	33,	198,	6,	123,	1037
390 DATA	1,	0,	3,	243,	83,	81,	186,	124,	721
391 DATA	1,	185,	40,	0,	187,	2,	0,	180,	595
392 DATA	64,	205,	33,	89,	91,	180,	8,	205,	875
393 DATA	33,	232,	14,	0,	226,	162,	31,	94,	792
394 DATA	90,	91,	195,	138,	208,	180,	2,	205,	1109
395 DATA	33,	195,	176,	13,	232,	244,	255,	176,	1324
396 DATA	10,	232,	239,	255,	195,	172,	232,	234,	1569
397 DATA	255,	226,	250,	195,	81,	185,	32,	0,	1224
398 DATA	232,	242,	255,	70,	185,	6,	0,	232,	1222
399 DATA	235,	255,	89,	195,	0,	0,	0,	0,	774

(Figure 1 ends)

loaded. COMMAND.COM also takes over during critical hardware errors and issues the much-loved "Abort, Retry, Ignore?" message.

As if to complicate matters, COMMAND.COM divides itself into two pieces when it is first loaded into memory. The "resident" part of COMMAND.COM, about 3K bytes, sits in the lower end of memory above the other two DOS files. The "transient" part of COMMAND.COM—the bulk of the program—resides up at the very top of user memory.

Why the split? The reason is that the transient part of COMMAND.COM interprets and executes the DOS internal commands and does batch file processing. These facilities are not needed when other programs are running. So, by putting itself at the top of memory, the transient COM-

MAND.COM allows itself to be overwritten by other programs if they need the space.

When a program exits, control is returned to the resident part of COMMAND.COM. This then does a simple sum check of the memory area normally occupied by the transient COMMAND.COM. If it doesn't check, then the transient part was at least partly overwritten and is now invalid. Finding this, the resident part reloads the transient COMMAND.COM back into memory. This reloading is the reason that an exit from a large program often causes a disk access. Some programs—like Lotus's 1-2-3 and many compilers—always use the top area, so reloading the transient COMMAND.COM is always necessary.

I mentioned earlier that our double-column directory program DDIR will invoke the DIR command, which is located in the

transient part of COMMAND.COM. But when running another program (such as DDIR), the transient COMMAND.COM cannot be trusted to be valid. So how can we proceed?

Loading Secondary Command Processors

If you search hard in the PC-DOS manuals for Versions 2.0 and above, you will find a short, 1½-page section on loading "secondary command processors." Look in Appendix F in the DOS 2.0 manual, page 1-11 in the DOS 2.1 manual, chapter 7 of the DOS 2.1 technical reference manual (which omits the crucial /c parameter), and chapter 7 of the DOS 3.0 technical reference manual (which gets it right).

What these sources say is that you can execute any DOS internal command (or any .COM, .EXE, or .BAT program for

that matter) from within an assembly language program by loading in a secondary copy of COMMAND.COM and passing it to a parameter containing the command or program name. COMMAND.COM will then do all the messy stuff and return control back to your program.

Thus, you can actually load in a secondary version of COMMAND.COM right on the DOS command level. Compare the size of the available memory reported by a simple CHKDSK with that reported by

COMMAND /c CHKDSK

The difference is the amount of memory taken up by the second resident portion of COMMAND.COM. When a /c and a command are given after COMMAND, as in this example, COMMAND.COM then executes the parameter (CHKDSK). It then terminates, just like any other program, by returning control to the previously executing program—which in this case is the primary COMMAND.COM.

Loading a second version of COMMAND.COM from within an assembly language program is somewhat complicated, but since you may need to do it with programs of your own, it's worth explaining. There are several steps involved.

First, you must make sure there is enough memory for DOS to load the second COMMAND.COM. When a program first begins executing, all available memory is allocated to it. Thus, some of this memory must be freed up. Before the memory is freed up, the stack pointer may have to be moved from the area of memory being freed, so the stack doesn't get destroyed.

Second, you must determine where COMMAND.COM is currently stored. On a two-floppy system this is generally drive A; on a PC-XT it will generally be drive C; on my system, on the other hand, it's in the subdirectory DOS31 of drive D: of my Bernoulli Box. In other words, you can't just guess where COMMAND.COM actually resides. It may be different on different systems.

This is where the "environment" provided by DOS 2.0 and above comes in handy. In DOS 2.0 and above, programs have access to an environment, which is an area in memory with strings that show the

current DOS prompt, any path you may have set with the PATH command, and the drive, directory, and filename of your current command processor.

If you'd like to see your current environment, just issue the SET command. One of the lines printed out will begin with "COMSPEC=" and will show the drive, directory, and filename of the command processor COMMAND.COM. Any program can get at its environment by accessing the memory beginning at the segment address stored in offset 002Ch of the Program Segment Prefix.

When your program finds where COMMAND.COM is stored, it can perform a PC-DOS EXEC call, namely, function call 4Bh of Interrupt 21h. The EXEC call can load in any .COM or .EXE file and execute it, with minimum fuss by the programmer. It requires a block that contains parameters to pass to the program, but that's it. In setting up DDIR, the parameters to pass with the EXEC call will be the DIR command we want COMMAND.COM to execute. And, of course, when we tell COMMAND.COM to do its normal DIR, we will be watching for screen output so we can sort the listing, put it in an economical two columns instead of the wasteful one, and pause after every full screen.

From Theory to Practice

From this point on you'll find it helpful if you have obtained (by modem or mail) a copy of the actual assembly language listing DDIR.ASM. That way, in addition to following the steps involved, you can see how they are translated into workable code.

As a first step, memory to accommodate 528 files (11 screens of 48 files each) is blanked out, and the stack pointer is set to 256 bytes beyond that area. Then the DOS SETBLOCK function call 4Ah is issued, which shrinks down the memory allocated for ES (i.e., the DDIR program) to BX paragraphs. Now there should be plenty of room for COMMAND.COM.

Next the environment must be searched for the drive and directory of the command processor, COMMAND.COM. The segment address of the environment is located in offset 002Ch of the program segment prefix, and ES must be set to that segment.

Compare These Prices

IBM Products

Software

	Bellwether	List
Multimate	\$297.00	\$495.00
Microsoft Word	\$225.00	\$375.00
Smart Software System	\$537.00	\$895.00
Microsoft Chart	\$150.00	\$250.00
Desk Organizer	\$117.00	\$195.00
Word Perfect	\$297.00	\$495.00
Wordstar 2000	\$297.00	\$495.00
Spotlight	\$90.00	\$150.00
Harvard Project Manager	\$237.00	\$395.00
Microsoft Flight Simulator	\$30.00	\$50.00
Managing Your Money	\$120.00	\$200.00
Thinkspeak	\$117.00	\$195.00
Supercalc 3	\$237.00	\$395.00
Side Kick (Unprotected)	\$51.00	\$85.00
Multiphan	\$117.00	\$195.00

Hardware

AST Six Pack + w/64K	\$277.00	\$395.00
Hercules Color Card	\$160.00	\$245.00
Hercules Graphics Card	\$325.00	\$495.00
Microsoft Mouse	\$127.00	\$195.00
M S PC Mouse w/Software	\$127.00	\$195.00
Toscan 420 (RGB w/Cable)	\$260.00	\$550.00
Epson MX-80 Ribbon	\$8.00	\$13.00
Paradise Multisync Card	\$300.00	\$450.00
ICE 1200 300 Modem Card	\$355.00	\$545.00
Elephant DS-DD 5+4	\$21.00	\$45.00
Match III Joystick	\$33.00	\$55.00

CALL TOLL FREE

1-800-824-8064
COLORADO AND CANADA
CALL COLLECT
1-303-442-2806

For fast delivery send cashier's check, certified check or money order. Personal or company checks allow 3 weeks to clear. Shipping and handling, add 5%. C.O.D. add \$2.00. MasterCard and Visa send card number and expiration date and add 3%. Colorado residents add 5.75% sales tax. Prices subject to change without notice. All returns must have authorization number. Call (303) 442-2806 to obtain one. Mail or phone orders accepted.

Hours: 7:00 a.m. - 7:00 p.m. Mon.-Fri.

Visa

MasterCard

Bellwether Software

P.O. Box 2238 Boulder, CO 80306
CIRCLE 173 ON READER SERVICE CARD

PROGRAMMING

DI is set to point to the beginning of the environment. When the "COMSPEC=" is found, it is followed by the drive, directory, and name of the command processor and is terminated by a byte of zeros. It is

thus an ASCII string—exactly what we need to execute the COMMAND.COM file.

We must then prepare a parameter block for the EXEC call. This block re-

quires a segment address of the environment, which we already know, plus addresses of the file control blocks (FCB) and an unformatted parameter that will be placed in the Program Segment Prefix when COMMAND.COM is loaded and executed.

At this point, we save the current vector address of Interrupt 21h and reset it to a routine within the DDIR program. We are going to intercept Interrupt 21h so we can fiddle around with the DIR screen output.

The unformatted parameter area for

Loading a second version of COMMAND.COM from within an assembly program is complicated, but you may need to do it.

COMMAND.COM will be similar to the unformatted parameter in DDIR's own Program Segment Prefix, but with a few additions. To take an example, if you have issued the command

DDIR 'MYWORK'.TXT

then the "OldParameter" at offset 80h in the Program Segment Prefix will contain the number of bytes in the parameter. (In this case it is 14 or 0Eh, counting the first space.) Offset 81h will contain a space, and 'MYWORK'.TXT will begin at offset 82h.

The parameter to pass to COMMAND.COM must be

/CDIR 'MYWORK'.TXT

This parameter is five characters longer than the parameter actually passed to DDIR. So it's just a matter of adjusting the number of bytes and inserting a /C and a DIR.

Now we are ready to load COMMAND.COM. The EXEC function call (4Bh) requires ES:BX to be set to the parameter block, DS:DX to be set to the ASCII string of the program being loaded (which we found by searching the environment), and AL to be set to zero for a program load.

The EXEC call loads COMMAND.COM and passes the parameter to it for the DIR command. COMMAND.COM

ACCOUNTING FOR MICROS

\$395

Set of Four
\$325 Set of Three
\$465 Set of Five

ACCOUNTING FOR MICROS is a fully integrated accounting system that meets professional standards. They're fast and easy to use, with simple instructions. Our manual (shown above) also includes helpful information on bookkeeping and computers.

GENERAL LEDGER **\$125**
Allows up to 1,000 accounts & 1,000 transactions/month. Retains stored balances for Last year, This Year and Forecast. Includes Cash Disbursements, Cash Receipts and General Journals. Reports include Balance Sheet, Income Statement, Annual Summaries and Journal Reports.

ACCOUNTS RECEIVABLE **\$125**
Allows up to 2,500 customers and 1,000 invoices per month. Invoicing can access Inventory Module. Keeps customer names and addresses. Invoices print on plain paper or on pre-printed form. Statements can be printed at any time.

INVENTORY **\$125**
Allows up to 4,000 parts. Keeps 3 month history of unit sales as well as year to date. With AR, can be used as point of sale system (prints invoices, handles cash). Reports include Inventory Value and Stock Report, Internal and Customer Price List.

ACCOUNTS PAYABLE **\$125**
Allows up to 1,000 vendors and 1,000 invoices/month. Prints and prints checks on any pre-printed form. Keeps vendor names and addresses.

PROPERTY **\$125**
Will handle up to 100 employees with eight deductions per employee. Deductions may be determined as fixed dollar amounts or percentages, or referred to a table for automatic look-up. Tax tables are easily entered, or purchased separately. Prints checks and W-2s.

SET OF FIVE **\$465**
SET OF FOUR **\$325**
SET OF THREE **\$125**

RUN ON MOST CP/M AND MSDOS

Apple CPM	IBM PC, XT, PC+ AT	Sony 161
Commodore	Macintosh (16)	Sharp 161
Compaq	Monitor (16)	Norandus
Corvus	Outlook 161	Zenith 100 & 150
Epac 161	Parsons	4" CPM
Exxon QX-16	Radio Shack CPM	Other compatibles

DEMO DISK
\$18.00



Try all 5 programs above (GL, AR, AP, IN, PR) Order our DEMO DISK for \$18.00 (includes shipping). Condensed versions of the programs give you the "feel" of data entry and access. Includes sample reports and instructions. Specify machine.

TMAN **\$125**
The "Catch-All" program. Files any type of information for quick access. Name or subject oriented with 15 lines of notes per name. Use TMAN as a mailing list, filing system, notebook, etc. Can be used alone or with data from our other programs.

Try TMAN DEMO **\$18**

HOW TO ORDER: Please specify machine and disk format. You may pay by check, by VISA or MasterCard (we need your expiration date and card number), or by U.S. C.O.D. (add \$2.50 C.O.D. charge). Our price includes shipping. Minnesota residents, add 6% sales tax. We ship most orders the same day.

Or ORDER BY PHONE: 612-339-2521

James River Group



Dept. PC
125 North First Street
Minneapolis, MN 55401

(612)339-2521

does its normal directory list, but we'll be intercepting its Interrupt 21h calls to do something different with the output.

After the directory is finished, DOS will return control to the statement in DDIR following the EXEC call.

We reset the Interrupt 21h vector address and do a quick check that the return from the EXEC call was okay. It will not be okay if DOS could not find COMMAND.COM or if there was not enough memory to load it. And that's it. DDIR then just terminates normally. If we had not intercepted Interrupt 21h, we'd get a normal directory listing. But now let's see what happens when COMMAND.COM tries to display the DIR output.

The Interrupt 21h Intercept

Our intercept of Interrupt 21h takes normal DIR screen output and saves the file listing in a buffer area. After the file listing is completed (or 528 files have been saved), the listing will be sorted and output to the display 48 files at a time in two columns.

COMMAND.COM does most of its screen display by using DOS function call 40h. Our intercept of Interrupt 21h first goes through a series of checks to determine what COMMAND.COM is attempt-

I've found DDIR to be one of the simplest and most valuable utilities on my PC now.

ing to print on the display. Although the text comes through in bits and pieces, the only output that begins in column 1 is the file listing. Other information is indented. In this way, we can fairly easily separate the file lines from other DIR output.

When the file listing is completed, or 528 files have been saved, the entire file listing is sorted. This is easier than most text sorts because all the lines are the same length. A simple bubble sort is used, simplified greatly by the use of the powerful 8086/8088 string move instructions.

The display of this sorted list is a little more complicated, because we'd like the list to be in alphabetical order down the

first column and then continuing down the second column. The file listing is compressed a little, so a vertical line can be drawn between the two columns.

If you have more than 528 files in a sub-

directory, you probably have a very disorganized system, but DDIR will alphabetize the first 528, print them out, clear out the storage area, and will then start in on the next 528.



"Volkswriter® Deluxe..." the critics' choice!

“Thirty word processing programs were reviewed ... no other program received a higher overall evaluation than Volkswriter Deluxe.”

Software Digest Ratings Newsletter,
January 1984

“If WordStar™ set a standard ...

Volkswriter Deluxe sets a new standard for transparency, simplicity, and speed. You can learn Volkswriter in under an hour ... because it does so many things exactly the way you think they should be done.”

“VOLKSWRITER DELUXE is the best buy in the IBM-PC™ writing tool arena.”

Charles Spezzano, *Whole Earth Software Review*, January 15, 1984

“Volkswriter Deluxe ... a simple way to word processing power ... for writers who like to think.”

Washington DC Capital PC User's Group Vol. 3, #4

“Lifetree ... provides exceptionally helpful and competent assistance to registered owners, and the company's update policies are excellent.”

“In sum, this is a unique word-processing program.”

John Lombardi, *Reviewer*,
InfoWorld, April 16, 1984

We couldn't have said it better ourselves!

Suggested Retail Price: Volkswriter
Deluxe: \$295 for the IBM-PC,
PC compatibles, TI Professional™
and TRS-80 Model 2000.*

“Simply amazing”

IBM PC is a trademark of International Business
Machines. TI Professional Computer is a trademark of
Texas Instruments. TRS-80 Model 2000 is a trademark of
Tandy Corp. WordStar is a trademark of MicroPro.

© 1984 Lifetree Software, Inc.

FREE
ATTN TRAINING DISK
WITH PURCHASE OF
Volkswriter Deluxe
\$39.95 ADDED VALUE

**LIFETREE
SOFTWARE INC.**

411 Pacific Street
Monterey, California 91941
(408) 373-4718 / TWX 176786

PROBLEM: WP and PC INCOMPATIBILITY SOLUTION: SYSTEMS COMPATIBILITY CORPORATION

DEC, IBM, XEROX, WANG, LEXTRON, PHILIPS/MICOM, VYDEC, LANIER, NBI, CPT, IBM PCs, MULTIMATE, DISPLAYWRITE III, WORDSTAR or SAMNA WORD—ALL NOW COMPATIBLE!

Switching from an old WP to a new one? Need to transfer information between your PCs and your WPs? Want to send documents from your city or department to another type of WP or PC in another city or department?

Systems Compatibility Corporation gives you the ability to share information between all major word processors and IBM PCs/compatibles, while maintaining complete editability. Here is a partial list of SCC's products:

Model 404—our most versatile device allowing you to communicate, convert, transfer and edit documents between most WPs and PCs.

Software Bridge—convert documents between any of the following types of IBM PC WP software: Multimate, Samna word, Displaywrite III or Wordstar. Convert Wordstar documents to Multimate, Displaywrite III to Samna word, etc.

The SCC Media Conversion Bureau provides in-house conversions of documents between any of the machines listed above. For more information or our free catalog call:

(312) 329-0700

Linkage One—connect your WP to IBM PCs/compatibles using Multimate, Wordstar, Samna word or Displaywrite. Communicate, convert, transfer and edit in either direction.

W-Link—convert IBM PC Multimate documents to Wang PC Advanced WP documents. Documents are editable and transferable in either direction—Wang PC-to-IBM PC or IBM PC-to-Wang PC.

Textcom/Officecom—access your Wang WP from your IBM PC/compatible running Multimate or Officewriter WP software, conversions and communications go both directions.


systems compatibility corporation
410 W. Michigan Avenue • Chicago, Illinois • 60611

CIRCLE 222 ON READER SERVICE CARD

PROGRAMMING

Some Peculiarities

If you're accustomed to using the F3 key to recall command lines, you'll find it doesn't work after DDIR has run. That's because the secondary version of COMMAND.COM we've loaded has wiped out the previous keyboard buffer information. Although the /w and /p options can be used with DDIR, they are not of much use and will create nonsense.

The execution of DDIR is somewhat slower than a normal DIR command. Before the directory listing can even begin, both the DDIR program and COMMAND.COM must be loaded from disk into memory. With a hard disk system, this speed penalty will not be severe, and even with a floppy disk system, it will not be slower than using SORT to arrange the directory listing.

DDIR will not work under the Run option of WordStar, since WordStar uses the top of memory to store code to reload itself. This will be overwritten by the transient COMMAND.COM, and your system will crash. Other applications that allow execution of external programs may or may not handle DDIR gracefully. You'll just have to try them out.

If you have DOS 3.0 or above and use DEBUG to trace through the execution of DDIR, you'll find the DEBUG display disappears right after DDIR sets its own Interrupt 21h handler. Don't worry—DEBUG is still working properly, but it's also using function call 40h to write to the display—and DDIR is grabbing its output. Don't quit DEBUG before DDIR resets Interrupt 21h with its original value unless you like rebooting. Just hit G (GO command) to continue execution, and you'll see pieces of the missing DEBUG output mixed in with the directory listing.

I've found DDIR to be one of the simplest and most valuable utilities on my PC now. I use it more frequently than the regular DIR command, since it takes the same parameters and gives me the same information, but more of it per screen. Whenever I realize I've accidentally entered a plain old DIR, I break out, hit Ins, a D, then F3, and Enter. I don't like wasted display space. DDIR eliminates it. ■

Charles Petzold is a frequent contributor to PC Magazine.



The Heavens At Your Command

*Spot Halley's Comet Now —
With PC Planetarium*

PC Planetarium.

One brilliantly conceived, meticulously executed, wonderfully easy-to-use software package for both serious astronomers and would-be watchers.

With PC Planetarium in your IBM PC (or PC-compatible) you can:

- ☆ Call up a stellar chart that tracks Halley's Comet, planets out to Saturn, the sun, moon and hundreds of stars.
- ☆ Highlight any constellation.
- ☆ Identify, calculate the coordinates of, and set your telescope for any object.
- ☆ Print high-resolution sky maps.

Summon the heavens. From any point on earth. For any moment in the past, present or future. All, with the greatest ease and accuracy.

ABOUT THE CREATOR: Marilyn Davis (Ph.D., UCSD, Radio Astronomy) is also the author of the widely acclaimed BASIC Primer, published by IBM.

IBM is a registered trademark of International Business Machines Corp.

To have your PC Planetarium shipped fast just send a check for \$52 and this coupon:
Light Software, Drawer C, 369 Pine St.,
Mezzanine, San Francisco, CA 94104. Call:
(415) 788-4578. Or ask a computer store near you.

Name

Address

Zip

CIRCLE 334 ON READER SERVICE CARD

HARD DRIVE PRICE BREAKTHROUGH

STARTING AT \$299.95!

5 to 60 megabytes complete easy to install internal and external systems
— will boot just like an XT — fully warranted —
same day shipping from stock — fast service — free technical assistance

\$499.95 to \$999.95

STREAMING OR FLOPPY TAPE BACK UP SYSTEMS

complete internal and external systems

\$1,995.00 — IBM XT WORKALIKE SPECIAL

20 megabytes — one floppy — 640K — clock calendar — serial port — parallel port
monochrome card — monochrome monitor with tilt and swivel base
Keytronics 5151 style keyboard — one year warranty — shipped from stock

MEGADISK™ HARD DISK DRIVE SYSTEMS

For the { IBM/PC, Tandy 1000, TRS/80 Models I/III/IV/4P, Compaq, PC Workalikes, Color Computers, Heath/Zenith, Max/80

{ Complete with Hardware, Cables, Software and Quikfit Installation

5 Megabytes Internal Mount	Wow! New Low Prices	starting at \$ 279.95
10 Megabytes Internal Mount		starting at 439.95 439.95
20 Megabytes Internal Mount		starting at 499.95 499.95
5 Megabytes External System		starting at 499.95
10 Megabytes External System		starting at 639.95
20 Megabytes External System		starting at 799.95
Tape Backup System — Internal Or External		starting at 449.95

DOS Systems Available: { IBM/Heath — DOS, 1.0, 2.0, 2.1, 3.0, or later
{ TRS/80-LDOS, TRSDOS 6.x, Newdos/80, Dosplus, CP/M, COCO DOS, Max/80 LDOS, OS9

FULLY WARRANTED — PARTS AND LABOR — 24 HOUR SERVICE — CALL TOLL FREE — 1-800-343-8841

IBM ENHANCEMENT CARDS

Multifunction with 384K	\$259.95	Color graphics	\$139.95
Serial port, parallel port		Monochrome/RGB Color	229.95
Clock calendar, game port		Disk controller with cable — up to 4 drives	79.95
Serial port — two port	69.95	384K memory	129.95
Monochrome only	119.95	Hard drive controller	199.95
Monochrome graphics w/parallel port	159.95	Keytronics 5151 style keyboard	129.95
Network card			249.95

DEALER INQUIRIES INVITED
CALL 1-617-872-9090

PRICES CHANGE EVERY DAY
CALL 1-800-343-8841

PC

© 1985

SOFTWARE SUPPORT, INC.

1 Edgell Road, Framingham, MA 01701 (617) 872-9090 Telex-383425

Hours: Mon. thru Fri. 9:30 am to 5:30 pm (E.S.T.) Sat. 10 am to 3:30 pm

SERVICE POLICY — Our Professional Technical Staff Is Available To Assist You Monday Through Saturday.
WARRANTIES — Up To One Full Year Parts And Labor. Floppy Disk Drive Power Supplies — Five (5) Years.

SERVICE — 24 Hour Turn-A-Round On All In-Stock Parts. Dealer Inquiries Invited. Call 617-872-9090

Please Call For Shipping,
Handling And Insurance.

Toll Free 1-800-343-8841

Please Call For Our Latest Price Saving Specials.

Not Responsible for Typographical Errors.
Prices and Specifications May Change
Without Notice.

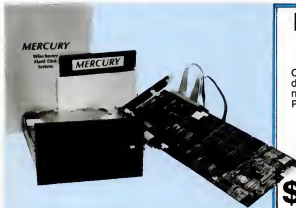
CIRCLE 156 ON READER SERVICE CARD

Call
Toll Free
1-800-531-5475

CompuAdd

"Computers & Add-On Products"

All Prices Include Free Shipping!!!



Mercury Hard Disk for the IBM PC

Convert your PC to an XT with our Mercury hard disk kits. Complete with cables, manuals, mounting hardware and easy-to-use software. Plus a one year warranty!

	Mercury PC-10	
	\$419	
Mercury PC-20	\$529	Mercury PC-30
	\$795	

Special Price!

Mercury Hard Disk for the IBM AT™

Enhance your basic IBM AT with our state-of-the-art Mercury AT hard disks. Complete with cables, manuals, and mounting rails. Includes a one year warranty!

Mercury AT-20	Mercury AT-30
\$559	\$729

10 MB
Hard Disk
for the
COMPAQ
Portable

\$475

Mercury
Tape Back-up
by



\$395

AST SixPakPlus

The World's best selling multifunction board for IBM PC. Complete with 384K Memory, serial port, parallel port, and electronic disk and print buffer software.

\$279

AST Advantage!

PC-AT multifunction expansion board offering up to 1.5 MB of Memory, serial port and parallel port.

\$399

135 Watt
Power
Supply

\$95

Teac 55B
Half Height

\$99

Memory
1 Year Warranty
9 Chips per set

64K.....**\$8**
256K....**\$39**

Intel
Math Co-Processor

8087**\$98**
80287..**\$219**

360K
Floppy Drive
for the IBM AT

\$119

MINUTEMAN™
Total Power Protection!
Blackouts Surges
Interruptions Spikes
Brownouts EMI/RFI Noise
Minuteman 250
250 watts output
power capability...**\$399**
Minuteman 500
500 watts output
power capability...**\$549**

Corporate & Institutional Accounts Welcome...

STANDARD BRAND PRODUCTS

All Standard Products
Have A 2 Year Warranty!

Standard MFC Multifunction Card

with 384K



- Parallel Port
- Memory Expansion
- Game Port
- Clock Calendar
- Serial Port

\$209

Standard 5151 Keyboard



- Quiet, Soft Touch
- 5151 Style Keyboard
- Compatible With IBM PC & XT

\$129

Standard Printer Cable



- Nine Foot Length
- Grounded
- Parallel

\$25

Standard FDC Floppy Disk Controller w/Cables



\$89

IBM[®] PC's & AT's



Call for Price\$\$\$

Printers EPSON[®]

LX 80.....	\$229
FX 85.....	\$379
FX 185.....	\$499
LQ 1500.....	\$929

Okidata

OKI 192.....	\$349
OKI 193.....	\$569

NEC

NEC e+1 f.....	\$459
----------------	--------------



HP7470	
2 pen, serial.....	\$829
HP7475	
6 pen, serial.....	\$1419

Boards Hercules

Monochrome	
Graphics Card.....	\$309
Color	
Graphics Card.....	\$165

Monitors



Princeton Graphic Systems	
HX 12	
Color Monitor.....	\$475

Amdek 310A	
Monochrome Display.....	\$175
Amdek 300A	
Amber Composite Display...	\$159

Quadram Amberchrome	
Amber Monochrome	
Display.....	\$175

Hayes Smartmodels

300.....	\$159
1200B.....	\$359
1200.....	\$389
2400.....	\$699

Diskettes

CDC dis.....	\$15
3M DS.....	\$28
3M SS.....	\$19
Verbatim os.....	\$28
Verbatim SS.....	\$19
Maxell High Density for IBM AT.....	\$49

Software

MicroPro WordStar Pro Pak.....	\$259
MicroPro WordStar 2000.....	\$315
MicroSoft word.....	\$259
Ashton-Tate Framework.....	\$379
Borland TurboPascal.....	\$39
Crosstalk xvi.....	\$129
Hayes Smartcom II.....	\$110

Misc.

MasterPiece.....	\$109
by Kensington Microswr.....	
Keytronics KB5151.....	\$189
Deluxe Keyboard.....	
Rolltop 100.....	
Diskette Holder.....	\$29

RETAIL OUTLET
204 E. 5th
Austin, TX 78701
512-478-7374

RETAIL OUTLET
3001 Bee Cave Rd.
Austin, Texas 78746
512-357-6822

RETAIL OUTLET
13201 Research Blvd. Suite 14
Austin, Texas 78719
512-250-6584

RETAIL OUTLET
5720 Bandera Rd. Suite 14
San Antonio, Texas 78238
512-684-6016

RETAIL OUTLET
437 S. Milam Rd.
San Antonio, Texas 78205
512-525-1163

Our Policy: All prices include fully insured, UPS ground shipping, on all orders shipped in continental U.S.A. No surcharge for VISA, MasterCard or UPS COD payments (Minimum purchase of \$50 on COD & net term orders). We accept fortune 1000 & institutional purchase orders on a net terms basis (with credit approval) at no additional charge. Allow 7 days for personal check and company checks to clear.

Add 6.18% sales tax if a Texas resident. Prices are subject to change. All equipment carries a new factory warranty. All returned items must be accompanied by a return authorization number and subject to restocking fee.

Corporate & Institutional Accounts Welcome: Our national accounts division is dedicated to providing the prompt professional service required to keep your business running smoothly. We accept P.O.'s on a net terms basis, minimum order \$50 (please) offer next day shipping, free fully insured UPS ground shipment. We offer a full-time technical staff to answer any questions that might arise and to make fast repairs if needed. You'll notice the difference.

For product information, price quotes, technical support and orders call:
(800) 531-5475 (outside Texas) (512) 250-1489 (within Texas)



CompuAdd Corp.

12309-G Technology
Austin, TX 78727



**1-800-531-5475
Call Toll Free**

Incredible value!

Nashua Diskettes

LIFETIME WARRANTY!

85¢ ea. 5 1/4 SSDD 97¢ ea.
Qty 50 5 1/4 DSDO Qty 50

These are poly bagged diskettes packaged with Tyvek sleeves, reinforced hubs, user identification labels and write protect tabs. Nashua Corporation is a not a public company and a recognized leader in magnetic media.

SOFT SECTOR ONLY! Sold in multiples of 50 only

FOR ORDERS ONLY: INFORMATION & INQUIRIES:
1-800-621-6827 1-312-256-7140

(In Illinois 1-312-256-7140)

HOURS: 8AM-5PM Central Time, Monday-Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD!, Inc.

629 Green Bay Road • Winnetka, Illinois 60091

DISK
WORLD!

NASHUA
Authorized Distributor MAGNETIC
MEDIA

ATHANA DISKETTES

The great unknown!

79¢ ea. 5 1/4 SSDD 85¢ ea.
Qty 50 5 1/4 DSDO Qty 50

You've used these diskettes hundreds of times as copy-protected originals on some of the most popular software packages. They're packed in poly bags of 25 with Tyvek sleeves, reinforced hubs, user identification labels and write-protect tabs.

LIFETIME WARRANTY!

SOFT SECTOR ONLY! Sold in multiples of 50 only

FOR ORDERS ONLY: INFORMATION & INQUIRIES:
1-800-621-6827 1-312-256-7140

(In Illinois 1-312-256-7140)

HOURS: 8AM-5PM Central Time, Monday-Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD!, Inc.

629 Green Bay Road • Winnetka, Illinois 60091

DISK
WORLD!

ATHANA
Authorized Distributor MAGNETIC
MEDIA

DISKETTE STORAGE CASES

AMARAT MEDIA-MATE 50: A REVOLUTION IN DISKETTE STORAGE

Every once in a while, someone takes the time and makes it happen. This unit holds 50 5 1/4 diskettes, has drawers for easy stacking, inside pockets to keep diskettes from slipping and several other features. We like it!

DISKETTE 70 STORAGE: STILL A GREAT BUY.

Just like storage for 70 5 1/4 diskettes. See us today!

DISK CADDIES \$9.95 ea. \$10.00 ea. \$1.65 ea.

FOR ORDERS ONLY: INFORMATION & INQUIRIES:
1-800-621-6827 1-312-256-7140

(In Illinois 1-312-256-7140)

HOURS: 8AM-5PM Central Time, Monday-Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD!, Inc.

629 Green Bay Road • Winnetka, Illinois 60091

DISK
WORLD!

The value leader in
Computer supplies
And accessories.

FANTASTIC LOW PRICES ON

BASF QUALIMETRIC DISKETTES!

LIFETIME WARRANTY!

80¢ ea. 5 1/4 SSDD 92¢ ea.
Qty 50 5 1/4 DSDO Qty 50

PACKED IN CARDBOARD CASES!

BASF QUALIMETRIC DISKETTES have a LIFETIME WARRANTY with Tyvek sleeves, reinforced hubs, user identification labels and write-protect tabs.

SOFT SECTOR ONLY! MINIMUM ORDER: 50 DISKETTES
BASF 5 1/4" MICRO FLOPPIES BASF 5 1/4" MICRO FLOPPIES

FOR ORDERS ONLY: INFORMATION & INQUIRIES:
1-800-621-6827 1-312-256-7140

(In Illinois 1-312-256-7140)

HOURS: 8AM-5PM Central Time, Monday-Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD!, Inc.

629 Green Bay Road • Winnetka, Illinois 60091

DISK
WORLD!

Authorized Reseller
Information Processing • BASF
Media

DISK WORLD! Ordering & Shipping Instructions

Shipping 5 1/4 3 1/2 SSDD 1115 - 426 \$3.20 per each 100 of free diskettes. Other items: Add shipping charges as shown in addition to other shipping charges. Payment: CASH accepted. CREDIT: Add credit \$5.00 Special Handling charge. APO, FPO, AK, HI & PW Orders: include shipping charges as shown and additional 5% of total order amount to cover P&H and insurance. Taxes: Illinois residents only add 7% sales tax.

Prices subject to change without notice.

This ad supersedes all other ads.

Not responsible for typographical errors.

MINIMUM TOTAL ORDER: \$35.00

FOR ORDERS ONLY: INFORMATION & INQUIRIES:
1-800-621-6827 1-312-256-7140

(In Illinois 1-312-256-7140)

HOURS: 8AM-5PM Central Time, Monday-Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD!, Inc.

629 Green Bay Road • Winnetka, Illinois 60091

DISK
WORLD!

Authorized Reseller
Information Processing • BASF
Media

PRINTER RIBBONS:

at
extraordinary
prices!

Brand new ribbons, manufactured to Original Equipment Manufacturer's specifications, in housings that re-used or speeds only.

LIFETIME WARRANTY!

Epson MX-70/80 \$2.70 ea. + 25¢ Shpg.
Epson MX-100 \$4.08 ea. + 25¢ Shpg.
Okidata Micro83 \$1.37 ea. + 25¢ Shpg.
Okidata Micro84 \$2.98 ea. + 25¢ Shpg.

FOR ORDERS ONLY: INFORMATION & INQUIRIES:
1-800-621-6827 1-312-256-7140

(In Illinois 1-312-256-7140)

HOURS: 8AM-5PM Central Time, Monday-Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD!, Inc.

629 Green Bay Road • Winnetka, Illinois 60091

DISK
WORLD!

Authorized Reseller
Information Processing • BASF
Media

3M Scotch® DISKETTES

LIFETIME WARRANTY!

The best deal
on 3M diskettes
you've ever seen!

FREE!

FLIP N' FILE 15
with every order
for 5.25" SSDD and DSDO.



\$1.36 ea. - 5.25" SSDD with FREE Flip N' File 15
5.25" DSDO with FREE Flip N' File 15 - \$1.67 ea.

100% LIFETIME WARRANTY
MINIMUM ORDER: 50 DISKETTES

This is a Super Special promotion. It was supposed to end around the end of May.

But we decided to buy more than 1,000,000 3M diskettes packed in the FREE Flip N' File 15's...and give you the benefits of this terrific value.

One word of warning: this offer is limited only to supplies on hand. Once these supplies are used up, the prices stay the same...but there's no free Flip N' File.

The last time we ran an offer like this, everything was sold out in about six weeks.

So don't wait. Order now.

Other 3M diskettes:

(Flip N' File offer does not apply.)

5.25" SSDD-96TPI \$2.04 ea.

5.25" SSDD-96TPI \$2.48 ea.

5.25" DSDO-104TPI \$3.14 ea.

5.25" DSDO-135TPI for Apple Mac \$2.26 ea.

1BM PC/AT \$19.38 ea.

3.5" SSDD-135TPI for Apple Mac \$2.26 ea.

DATA CARTRIDGES

100% certified 3M data cartridges.

DC-1000 \$12.52 ea.

DC-300XLP \$19.38 ea.

DC-600A \$20.61 ea.

Sold in cases of 10 only.

Add \$5.00 shipping per 10.

DISK WORLD!

Authorized Reseller
Information Processing • BASF
Media

Products

3M

Spreadsheet Clinic

This forum offers our readers an opportunity to exchange the quick fixes, simple solutions, and fancy footwork they've developed to make their spreadsheets work better.

How to Find Thursday

Our accounting week always ends on Thursday, and I often need to insert that date into a 1-2-3 worksheet. I have found a way to determine the next Thursday's date, no matter which day of the week I happen to be running the program.

The procedure, which is outlined in Figure 1, uses the @VLOOKUP function instead of a macro. It starts in cell C19, with a formula (displayed to its immediate right) that subtracts the date of some past Thursday from today's date and then divides the remainder by 7. I used January 3, 1985, but any Thursday from the past will be good enough.

The integer part of the results in C19 will change by one for each succeeding week, but the fractional part is the same for every Monday, Tuesday, Wednesday, etc., on which the calculation is done. The

fraction that remains after subtracting the integer portion of C19 (this is done in cell C21) can therefore always be used to figure the number of days between today and Thursday. Cell C23 tests this fraction against the table in cells C25..D32 to find the number, which is subtracted from today's date in cell G26, to give the date for last Thursday. Since, in this example, today is Friday, you subtract 1 from today's date; if today were Tuesday, the procedure would subtract 5, and so forth. To find the date for next Thursday, just add 7 to the formula in G26.

Once you know the date of a specific day of the week, you can build a calendar by adding to last Thursday's date. At the bottom of Figure 1, Thursday is G26+7, Wednesday is G26+6, and so on.

If you always want to get the date for Thursday of the next week, you need only

change the values for Monday, Tuesday, Wednesday, and Thursday in cells D25..D31 from 4, 5, 6, and 7 to -3, -2, -1, and 0.

Dick Aitkins
Puyallup, Washington

Copying Database Formulas

The general format for 1-2-3 database formulas is @function name (Input range, Offset, Criterion range), with the offset expressed as a constant. This format is easy enough to use, but if you want to perform several different statistical operations on the same data, the constant in the formulas makes them hard to copy. Also, if you ever have to add a column to the database, or to remove one from it, you have to go back over your formulas and edit the offsets. I have devised a way to eliminate much of this editing.

	C	D	E	F	G	H
19	32.142857	<--(@TODAY-@DATE(85,1,3))/7			Today minus a past Thurs/7.	
20						
21	0.1428571	<--(C19-@INT(C19))			Subtract the integer.	
22						
23	1	<--@VLOOKUP(C21,C25..D32,1)			Subtract this number to find	
24		the date for last Thurs:				
25	0	7 days from Thursday				
26	0.1	1 days from Friday				
27	0.2	2 days from Saturday				
28	0.3	3 days from Sunday				
29	0.5	4 days from Monday				
30	0.6	5 days from Tuesday				
31	0.8	6 days from Wednesday				
32	0.9	22-Aug-85 <-- (@TODAY-C23)+7				
33						
34						
35		C A L E N D A R				
36		MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
37		19-Aug-85	20-Aug-85	21-Aug-85	22-Aug-85	23-Aug-85

Figure 1: Formulas that will always return the date of next Thursday; in this example "today" is Friday, August 16.

	A	B	C	D	E	F	G
1	0	1	2	3	4	5	6
2		Dept.					
3	Select==>	2	-----Monthly Sales by Item-----				
4	Item #	Dept.	January	February	March	April	May
5	1011	2	10	100	1	55	164
6	2341	3	22	18	21	32	51
7	2344	4	25	233	0	56	314
8	2454	5	31	65	74	143	165
9	3743	1	0	12	12	15	15
10	4790	1	1	21	6	0	16
11	5421	4	67	443	278	26	258
12	5790	4	52	0	50	76	78
13	8765	2	32	41	9	33	97
14	9807	2	87	29	90	3	29
15	-----						
16	Count	Sum	129	170	100	91	290
17	3	Minimum	10	29	1	3	29
18		Maximum	87	100	90	55	164
19		Mean	43.00	56.67	33.33	30.33	96.67
20		Std. Dev.	32.38	31.03	40.20	21.31	55.11

Figure 2: A sample database with offset numbers in line 1.

The simple database in Figure 2 illustrates both the problem and its solution. This chart shows monthly sales of the items in column A. Column B shows the department within the organization responsible for the sale of each item.

The chart is set up using database formulas in cells C16..G20 so as to track sales by department as well as by item. B3 is the input cell (it's part of the criterion range). When you enter the number of the department you want to track, the spreadsheet calculates the statistics in C16..G20 for that department. In the example in Figure 2, department 2 has been chosen, and the statistical operations in lines 16 through 20 are performed only on the monthly data that relates to department 2. For the formulas in C16..G20, the input range is A4..G14 (named DATABASE), and the criterion range is B2..B3 (named CRIT). The offset number is, of course, different for the formulas in the different columns. So far so good.

Suppose you had to write the formulas in cells C16..G20. The usual way to do it would be to put the formula

@DSUM(\$DATABASE, 2, \$CRIT)

in cell C16 first. Next, you would copy that formula to cells C17..C20 and then change the @DSUM to @DMAX, @DMIN, and so on. You would then copy C16..C20 to D16..G20. The function names would all be correct but the offset for every formula would be wrong. You would have to change them from 2 to 3, 4, 5, and so forth. As we'll see below, you've done more editing work than you had to, but the database will work properly.

What happens, though, if you need a summary of last year's figures and decide to add a new column to the left of column C? You will have to go back to every single formula in the range C16..G20 and change the offset number, just as you did when you copied the original formulas.

The way around this problem is to include a line (line 1 in Figure 2) that represents the offset numbers of each column. That way, the formula in cell C16 can be expressed as

@DSUM(\$DATABASE, C\$1, \$CRIT)

It may not look like much, but the mixed address of the offset number will solve your problems. Copy the formula to C17..C20 and edit the function names as above. Then copy C16..C20 to D16..G20—you won't have to edit the offset numbers, since each formula will take the value from line 1.

You get the real benefits of this method when you add or remove a column. If you add a column to the left of column D, say, just copy the formulas in C16..C20 to all the columns to the right exactly as you did before. Then go to line 1 and use the /Data Fill command to update the offset numbers. Removing a column is even easier. Just delete it and update the offset numbers. You'll never have to edit individual database formulas again.

Jim Pottkotter
Memphis, Tennessee

1-2-3 as a Diskette Librarian

With very little work, you can turn 1-2-3 into a diskette librarian that's better than several special-purpose programs, includ-

ing IBM's diskette librarian. All you need is to create ASCII files of your disk directories and import them into a 1-2-3 spreadsheet.

To create an ASCII directory file, just redirect the output of the DOS DIR command to a file on disk with the following command:

```
DIR d:>d:filename.PRN
```

Don't forget to give the file a PRN extension, because 1-2-3 won't import files with any other extension.

Import the disk directory file with the /File Import Text command. You will get an error message saying "Part of file is missing" when you hit Enter. Ignore that message. Just hit Enter again and the disk directory file will appear in your worksheet just below the cursor. (You get the error message because the DOS pipe used to create the directory file doesn't put a "Z" at the end.)

Use the same import command to read as many diskette directories as you like into the same worksheet. Identify the contents of each diskette with a DOS volume label, or give each directory in the worksheet a name, and write that name on the diskette's paper label. You will have plenty of room to identify each disk file within the 1-2-3 worksheet because you can put up to 240 characters in a single cell. (If you plan to print out your disk library, you had better limit your comments to your printer's maximum line length.)

If you keep your library up to date, you'll never have to worry again about where you put a file.

Steven Petersen
Omaha, Nebraska

An added bonus of this technique is that you can use 1-2-3's data commands to sort and search your disk directories. Also, if you don't need all the information in a

standard directory entry (such as the date and time when the file was last written), you can start your remarks in a column that overlaps that information and thus covers it up. If you decide you do need the date and time after all, just move the cursor back to the cell containing the directory entry, and all the original information will then appear in the first line of the control panel.

Contribute to the Clinic

Share your latest spreadsheet discovery through PC Magazine's Spreadsheet Clinic. We'll pay you \$50 for anything we print, plus an extra \$25 if you submit it on a disk. If you send a disk, please include a printout of your submission to ensure against damage in transit.

Mail your contributions to Spreadsheet Clinic, PC Magazine, One Park Avenue, New York, NY 10016—or send them to our electronic mailbox via MCI mail. ■

Can your editor work with 16,000,000 bytes of memory? SPF/PC™ 1.8 from CTC can!

The best full screen editor for the IBM PC is now even better than ever.
It looks and works like IBM's large system SPF editor, but SPF/PC
executes faster and handles larger files than its mainframe cousin.

AT EXTENDED MEMORY

SPF/PC can use up to 15,850 KB of memory.

TOP VIEW COMPATIBLE

SPF/PC supports windowing and background execution.

COMMUNICATIONS FEATURE

Easy to use communications software.

\$195

UPGRADES only \$50
(\$10 if communications upgrade)

Add \$5 for shipping
Canada \$10 Foreign \$15



Check or purchase order
accepted

FAMILY TIES

- **SPF/PC** is used by IBM to demonstrate the IBM 3270/PC to its corporate clients
- **SPF/PC** provides the same outstanding performance on any PC, from JR to AT
- **SPF/PC** works with DOS 1.00-3.00 and any IBM PC or true compatible with 192K

IBM is a registered trademark of International Business Machines, Inc. SPF/PC is a registered trademark of Command Technology Corporation.

**TO ORDER
SPF/PC...**

Contact: Command Technology Corporation
1900 Mountain Boulevard
Oakland, CA 94611

**(415) 339-3530
Telex: 509330**

Arlington Computer Products gives you the best prices on IBM PCs...

IBM-PC

2 Drives - 256K
Monochrome Monitor

\$1925

COLOR MONITOR \$2195

XT

1 Drive - 256K
10 MB Hard Disk
Monochrome Monitor

\$2650

20 MB HARD DISK \$2795

AT

1.2 Floppy - 512K
20 MB Hard Disk
Monochrome Monitor

\$4099

30 MB HARD DISK \$4499

COMPAQ PORTABLES

2 Drives, 640K
w/Clock

\$2125

CALL FOR QUOTES ON
OTHER COMPAQ SYSTEMS

1 Floppy, 640K w/Clock,
10 MB Hard Disk

\$2599

...and disk drives too!

IBM (WHILE SUPPLIES LAST)	\$ 119
TANDON TM100-2	\$ 99
SHUGART SA455	\$ 89
TEAC FD55B	\$ 89
360K Drive for AT	\$ 119

10 MB HARD DISKS

from **\$449**

20 MB HARD DISKS
from \$629

10 MB TAPE BACK UP \$499

★ ISSUE HIGHLIGHTS ★

AST 6 PACK w/384K
Clock/Calendar, P.S.G.
and 384K

\$259

HAYES
1200B

\$339

HERCULES
COLOR CARD

\$145

QUADBOARD w/384K
Clock/Calendar, P.S.G.
and 384K

\$239

EVEREX
GRAPHICS EDGE

\$269

PERSYST
COLOR CARD

\$125

EVEREX MAGICARD w/384K
Clock/Calendar, P.S.G.
and 384K

\$219

APPARAT
256K BOARD
w/256K

\$115

PRINCETON
HX 12
(includes cable)

\$419

PRINTERS

EPSON

LX 80	\$229
RX 100	\$369
FX 85	\$355
FX 185	\$489
LQ 1500	Call

OKIDATA

ML192	\$349
ML193	\$499
84 IBM	\$639

SILVER REED

EXP 400	\$249
EXP 500	\$289
EXP 550	\$399
EXP 770	\$699

TOSHIBA

1340	\$549
P351	\$1099

PERIPHERALS

STB GRAPHICS PLUS II	\$249	AST ADVANTAGE	\$399
PARADISE MODULAR GRAPHICS	\$259	AST 5251-11	\$649
HERCULES GRAPHICS CARD	\$289	HAYES 1200	\$389
HERCULES COLOR CARD	\$145	64K RAM CHIPS	\$ 10
EVEREX GRAPHICS EDGE	\$329	Bank of Nine	
TAXAN 440 & Super Hi-Res Board	\$769	256K CHIPS ea.	\$ 5
PERSYST MONOCHROME CARD	\$139	128K CHIPS ea.	\$ 8

**Arlington
Computer
Products**

450 E. HIGGINS ROAD
ELK GROVE VILLAGE, IL 60007



FOR ORDERS & SYSTEMS QUOTES:

800-548-5105

FOR INFORMATION AND IN ILLINOIS CALL 312-228-6333

CIRCLE 151 ON READER SERVICE CARD

Prices and Availability Subject To Change Without Notice

Power User

A column for PC readers who want to increase their productivity by sharing their hardware and applications software discoveries.

Speeding Up Conversion Programs

I recently had to connect an IBM PC to an IBM 6670 Laser Printer. Unfortunately, this printer requires the data to be in EBCDIC rather than ASCII. So, I wrote a program in assembler (to take advantage of speed) to make the conversion. The program uses DOS 2.0 (and above) redirection of standard input and output to avoid dealing with files in the program. It's run with the following command:

```
ASC2EBC <inputfile> >outputfile
```

The program simply reads the ASCII characters from the "keyboard" (redirected to be the input file), converts them, and then writes them to the "display" (redirected to the output file).

In timing the program, I find it takes about 45 minutes to completely convert a 1.8M ASCII file to EBCDIC on an IBM PC-AT. An EBCDIC-to-ASCII program can be written using the same principles.

T. Mark Denson
San Ysidro, California

An ASCII-to-EBCDIC converter provides an excellent example of a "filter" program, but 45 minutes? On a PC-AT? Maybe for a COBOL program, but for an assembler program?

That incredibly long run time results from your use of DOS function calls 2 and 8 to get one character from standard input and write one character to standard output. For your 1.8M file transfer, you have to make 3.6 million DOS calls. Moreover, the files are read from and written to the disk in 512-byte sectors, so you're doing about 7,000 disk accesses.

Programs that use redirection of standard I/O should use function calls 3Fh and 40h for the reading and writing. These function calls allow transferring up to 65,535 bytes at a time, reducing the number of DOS calls (and disk accesses) to about 60 for your 1.8M file. Figure 1 shows a rewritten version of your ASCII-to-EBCDIC converter that uses a large buffer. As written, it simply exits if an error

; ASC2EBC.ASM -- Program to convert an ASCII file to EBCDIC

CSEG	Segment	
	Assume	CS:CSEG, DS:CSEG, ES:CSEG, SS:CSEG
	Org	0100h
Entry:	Jmp	Begin
Table	db	000H, 001H, 002H, 003H, 007H, 002H, 02EH, 02FH
	db	016H, 005H, 025H, 00BH, 00CH, 00DH, 00EH, 00FH
	db	010H, 011H, 012H, 013H, 03CH, 03DH, 032H, 026H
	db	018H, 019H, 03FH, 027H, 022H, 01DH, 01EH, 01FH
	db	040H, 05AH, 07FH, 07BH, 05BH, 06CH, 05EH, 07DH
	db	04DH, 05DH, 05CH, 04EH, 06BH, 06EH, 04BH, 061H
	db	07EH, 0F1H, 0F2H, 0F3H, 0F4H, 0F5H, 0F6H, 0F7H
	db	0F8H, 0F9H, 07AH, 05EH, 04CH, 07EH, 06EH, 06FH
	db	07CH, 0C1H, 0C2H, 0C3H, 0C4H, 0C5H, 0C6H, 0C7H
	db	0C8H, 0C9H, 0D1H, 0D2H, 0D3H, 0D4H, 0D5H, 0D6H
	db	0D7H, 0D8H, 0D9H, 0E2H, 0E3H, 0E4H, 0E5H, 0E6H
	db	0E7H, 0E8H, 0E9H, 0ADH, 0BCH, 0BDH, 0BAH, 06DH
	db	07DH, 081H, 082H, 083H, 084H, 085H, 086H, 087H
	db	088H, 089H, 091H, 092H, 093H, 094H, 095H, 096H

(Figure 1 continues)

Figure 1. An ASCII-to-EBCDIC conversion program that uses redirection of standard input and output. DOS Function Calls 3Fh and 40h speed up operation by transferring up to 64K bytes at a single shot.



Do you spend 4 hours or more each day at your word processor?

NOW YOU CAN SAVE
45 MINUTES
EACH
DAY!

...Just By Switching To The Fastest Word Processing Software: XyWrite II PLUS.

XyWrite II PLUS is lightning-fast! Won't keep you waiting. Ideal for the serious word processing job or the professional writer. Thousands of satisfied XyWrite II PLUS users now enjoy the hours and days they save each month.

Time is money! The \$295 you invest in XyWrite II PLUS will be repaid in 3 months of time saved. Order now! XyWrite II PLUS requires the IBM PC, XT, AT, or compatible hardware, with 192K memory.

Order XyWrite II PLUS directly from us, the authors, or call



for a dealer near you. We wrote it, we support it after the sale. That's the best support you can get!



Call now: John Hild or David Erickson, at (617) 275-4439.

XyQuest Inc.

P.O. Box 372 Bedford, MA 01730
(617) 275-4439

```

db      097H,098H,099H,0A2H,0A3H,0A4H,0A5H,0A6H
db      0A7H,0A8H,0A9H,0C0H,04FH,0D0H,0A1H,007H

Begin:   Cld                                ; Direction Forward
         Mov     DX,Offset EndProg          ; Beyond end of program
         Mov     CX,SP                      ; Top of segment
         Sub     CX,100h                    ; Leave room for stack
         Sub     CX,DX                      ; Number of bytes for buffer

MainLoop: Mov    BX,0                      ; Standard Input
         Mov     AH,3Fh                     ; Read Function Call
         Int     21h                       ; Call DOS
         Jc      Exit                      ; Exit if error

         Push    CX                        ; Save requested read bytes
         Mov     CX,AX                      ; Get bytes read
         Jcxz    Exit                      ; Exit if no bytes read

         Mov     BX,Offset Table            ; Conversion Table
         Mov     SI,Offset EndProg         ; Beginning of Data
         Mov     DI,SI                     ; Destination is same
         Push    CX                        ; Save bytes actually read

Conversion: Lods    b                     ; Get byte
            And     AL,7Fh                 ; Strip out high bit
            Xlat    Table                 ; Convert it
            Stosb                    ; Save byte
            Loop   Conversion             ; For all data

            Pop     CX                     ; Get back bytes read
            Mov     BX,1                   ; Standard Output Handle
            Mov     AH,40h                 ; Write Function Call
            Int     21h                   ; Call DOS
            Jc      Exit                  ; Exit if error

            Cmp     AX,CX                  ; See if all bytes written
            Jb      Exit                  ; Exit if disk is full

            Pop     CX                     ; Get back bytes to read
            Jmp     MainLoop              ; Do next read

Exit:    Int     20h                      ; Terminate Program

EndProg  Label    Byte                    ; Buffer Area
CSEG     EndS
         End     Entry

```

(Figure 1 ends)

is encountered (such as a full disk), but you can easily make it more robust. It's in .COM file format so remember to run EX-E2BIN after LINK.

How fast is it? On my PC (not AT) using Bernoulli drives, I tried converting a 95K file. I clocked 16 minutes for your program and 5 seconds for the version in Figure 1.

Does this mean your 45-minute conversion will now take 15 seconds? Try it out and see. Then find some other job for your AT to do during lunchtime.

Superfast SideKick Searches

I've been using Borland's SideKick notepad for almost all of my smaller editing

tasks because of its usefulness and speed. There is one respect in which it appears painfully slow, however: the search-and-replace operation. Each replace causes the entire screen to be rewritten, so that for larger windows and especially for large numbers of replacements (using the NG option to replace all occurrences of a string

without asking), it can take quite a long time. For example, in a test file of 300 double-spaced X's using the full window, replacing them all with O's took an agonizing 2 minutes and 55 seconds on a 8 MHz AT&T PC 6300. Even lumbering *WordStar* appeared speedy by comparison, at 1 minute and 27 seconds.

The problem is not with the actual replacement process in memory, but with the slow screen display technique *SideKick* uses. Reducing the size of the window helps significantly, but it's something of a bother. A better solution (which is not mentioned anywhere in the *SideKick* documentation) is to press Ctrl-S immediately after the search-and-replace has begun. This method allows the replacements to proceed at full RAM speed, so that the task that I described above becomes virtually instantaneous, instead of requiring several maddening minutes.

Users of Turbo Pascal will be interested

to know that the same is true for the Turbo editor. I now find it very easy to use shorthand for common keywords (such as 'ww' for WRITELN) and then do large-scale replacements.

Sean Boisen
Los Angeles, California

Nice find, Sean. I tried this trick with both SideKick and the Turbo Pascal editor and found it works for any key pressed after the global nonverfify search-and-replace has begun. It even works with Ctrl-U, which is supposed to abort the search. The editor just zips to the bottom of the file after completing the job.

Hey, Borland—don't take this bug out, OK? It's a terrific feature.

Turbo Time and Date

When I got Borland's Turbo Pascal, one of the first things I looked for was a way to access DOS's date and time. But the Turbo

Pascal manual makes no mention of the system date or time. This left me with no choice but to use DOS function calls from within my program to get this information.

Armed with both the DOS Technical Reference Manual and the Turbo Pascal manual, the process is quite simple. The procedure "MsDos" generates a DOS Interrupt 21 function call using registers set up as a record. The two procedures GETDATE and GETTIME (shown in Figure 2) show how to use the LO and HI functions to extract the date and time information. Similar procedures can be written to set the date and time.

Cary V. Millsap
Milburn, Oklahoma

Most of the DOS function calls would not normally be used in Pascal programs, since the language itself provides a high-level interface to the system. But the absence of time and date functions in Turbo

**If You Work With One Of These...
...You May Be Entitled
To A Corporate Discount
On One Of These.**



Creative Computing. The #1 Magazine of Computer Applications and Software



**A +, The Independent
Guide for Apple
Computing**



PC Tech Journal,
The Magazine for IBM
PC Experts



PC, The Independent
Guide to IBM
Personal Computers A

**SAVE UP TO 50% WITH THE ZIFF-DAVIS
CORPORATE SUBSCRIPTION PROGRAM**

Complete and mail this coupon, or for faster service, call
Daniel Rosensweig collect at 212-503-5354.

THE MORE YOU ORDER THE MORE YOU SAVE!



ZIFF-DAVIS Corporate Subscription Program
 One Park Avenue, 4th Floor
 New York, NY 10016
 Attn: Daniel Rosensweig

- ☐ YES. I want more information on saving money through the ZIFF-DAVIS Corporate Subscription Plan.
- ☐ Please have Dan Rosensweig call me at:

() _____

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____


```

PROGRAM DateTime;      (* Cary V. Millsap  18 Jun 85 *)

TYPE  Registers = RECORD
        AX, BX, CX, DX, BP, SI, DI, DS, ES, Flags: INTEGER; END ;
Date = RECORD
        DayOfWeek, Year, Month, Day: INTEGER; END ;
Time = RECORD
        Hours, Minutes, Seconds, Hundredths: INTEGER; END ;

VAR   r      : Registers ;
      d      : Date ;
      t      : Time ;

CONST WeekSt  : String[21] = 'SunMonTueWedThuFriSatSun' ;
      MonthSt : String[36] = 'JanFebMarAprMayJunJulAugSepOctNovDec' ;

PROCEDURE GetDate(VAR d: Date);
BEGIN
  r.AX:= $2A00 ;          (*Place function number $2A (Get date) into AH*)
  Msdos (r);              (*Invoke DOS interrupt $21 *)
  d.DayOfWeek:= LO(r.AX);  (*Assign value of AL to d.DayOfWeek *)
  d.Year      := r.CX;     (*Assign value of CX to d.Year *)
  d.Month     := HI(r.DX); (*Assign value of DH to d.Month *)
  d.Day       := LO(r.DX); (*Assign value of DL to d.Day *)
END ;

PROCEDURE GetTime(VAR t: Time);
BEGIN
  r.AX:= $2C00 ;          (*Place function number $2C (Get time) into AH*)
  Msdos (r);              (*Invoke DOS interrupt $21 *)
  t.Hours     := HI(r.CX); (*Assign value of CH to t.Hours *)
  t.Minutes   := LO(r.CX); (*Assign value of CL to t.Minutes *)
  t.Seconds   := HI(r.DX); (*Assign value of DH to t.Seconds *)
  t.Hundredths:= LO(r.DX); (*Assign value of DL to t.Hundredths *)
END ;

BEGIN
  GetDate (d) ;
  WriteLn ('Date is ', Copy(WeekSt, 3 * d.DayOfWeek + 1, 3), d.Day:3, ' ',
          Copy(MonthSt, 3 * d.Month - 2, 3), d.Year:5) ;

  GetTime (t) ;
  WriteLn ('Time is ', t.Hours:2, ':', t.Minutes:2, ':',
          t.Seconds:2, '.', t.Hundredths:2) ;

END.

```

Figure 2: A Turbo Pascal program with procedures to obtain the system date and time.

Pascal is a glaring omission; Mr. Millsap's routines provide a way to get that information. Note that setting up "Date" and "Time" as records makes passing parameters to the procedures clean and simple.

Mr. Millsap's program used CASE statements to print out the day of the week and month name. I prefer the compactness of code when the text is extracted from a string constant using the COPY function.

Emboldening Your Words

Microsoft Word includes Tl855D.PRd and Tl855Q.PRd drivers for the Texas Instruments Tl855 dot matrix printer. When you select bold with Word, it uses the printer's own boldface print mode, which overprints the same characters in exactly the same place. In theory they're supposed to appear darker, but the difference is actually slight and almost indistinguishable

when you're using a fresh ribbon.

If characters with a little more emphasis are more to your liking, the printer has a "shadow" print mode where the characters are offset by 1/32 inch before overprinting. This produces characters more like the typeset characters you associate with boldface print. Unfortunately, Word uses this as a separate character font, rather than as the bold print option.

SIGMA DESIGNS

color
400

BEST PRICE!

\$495

The best color graphics card on the market today! Enjoy a 640x400 non-interlaced display. 16 vibrant colors, monochrome quality text and automatic double resolution on standard 200 line software. Package includes Paintbrush 400.

COLOR 400 W/SR-12 \$1050

COLOR 400 W/TAX 440 \$1050

PC MOUSE \$ 110

IMAGE-PLUS NEW! \$549

10 MB TAPE BACKUP

This low power internal tape unit runs off your floppy controller. Fully DOS compatible & accessible like a floppy. Includes drive, 2 tape reels, software & manual.

RAM-PLUS NEW! \$145

Creative Micro's new multifunction board comes with a par. ser. clk. cal. up to 38-K. RAM disk & spooler.

RAM-PLUS w/384K \$199

Creative Advantage

5 MB REMOVABLE

HARD DISK

\$895

Ideal for storage & backup! Includes drive, cartridge, controller, cables & manual. (Additional cartridges \$85)

Creative Edge

20 MB HARD DISK

\$695

Boot DOS 2.0-3.1 directly from your hard disk. Includes drive, controller, cables, & manual.

HARD DISK	INT.	*EXT.
5Mb Removable	895	1045
10Mb Half-hgt	569	745
20Mb Half-hgt	695	845
20Mb Full-hgt**	995	1045
30Mb Full-hgt**	1495	1645

*Externally mounted with fan and power supply
**includes disk power supply

SIGMA DESIGNS \$695

EXPANSION CHASSIS

The #1 exp. chassis! Includes 100W power supply, 9 card slots, 2 drive slots, 2 interface cards & cable.

MINI EXP. CHASSIS \$595

45MB TAPE BACK-UP \$995

HAYES 1200 Modem \$399

HAYES 1200B Modem \$365

Creative Micro

(415) 945-1201 (800) 321-3324



3339 Vincent Rd.,
Pleasant Hill, CA 94523



CIRCLE 381 ON READER SERVICE CARD

POWER USER

The solution is to change the PRD files so the printer "shadow" prints whenever bold is selected. This isn't as difficult as it sounds.

Microsoft furnishes a CONVPRD .EXE utility that converts any Word PRD file to DOC files that can be edited with Word or another editor. Documentation for CONVPRD is found in CONVPRD .DOC, supplied on the Word utility disk. All you have to do is change two control codes in the printer control sequence description table (PCD) in the PRD file as follows (be sure to use a copy):

1. Change: byte:128 mod:0 ""[K2"
To read: byte:128 mod:0 ""[Q"
2. Change: byte:132 mod:0 ""[M"
To read: byte:132 mod:0 ""[R"

Copy everything exactly as shown. You may want to rename the modified copies T1855DS.PRD for draft print with shadow boldface and T1855QS.PRD for quality print with shadow boldface. Complete the job by converting the new PRD files back to binary using CONVPRD .EXE (it works in either direction).

Then load your choice into Word with the PRINT OPTIONS command and print boldly!

Bill Kraengel, Jr.
Valley Stream, New York

The documentation for CONVPRD is convoluted enough to scare the socks off anyone, but it turns out that it's not so hard to work with Word's PRD files and change them around. A few tips may be in order.

CONVPRD expects all characters with ASCII codes less than 32 (blank) to be entered as "control characters," which Microsoft defines for PRD files as a caret (^) followed by the character whose position in the alphabet matches the ASCII code you want.

In that format, "Z" represents an ASCII 12. Mr. Kraengel's example makes heavy use of "Z", the control code format for Escape (ASCII 27). Since there are only 26 characters in the alphabet, control code formats stick on characters in their ASCII position after character 26 ("Z"). All characters entered in the PCD's must be enclosed in double quote marks ("").

Thanks for the tip, Bill. You inspired a

fun weekend of fine-tuning my own PRD files. You may want to do some more tuning yourself whether you have a T1855 or not—Word's PRD files are not bug free, and many can be modified for better printer performance.

Proportional Spacing Bug

Here's an easy way to obtain true proportionally spaced output in WordStar, using DOS 2.0 or higher. First, set your letter quality printer's front-panel switch to PS. Second, when WordStar's print menu asks "DISK FILE OUTPUT?" answer Y and specify the output name as PRN. Then hit Esc and you have it: PS on WS.

The reason this works is that DOS 2.x or 3.x interprets the file creation request "incorrectly" by interpreting the PRN filename you specified as a request for services from the parallel printer. (If you're using a serial printer, use COM1 instead of PRN.)

The only catch is that you may want to change the page offset to compensate for the tighter spacing in proportionally spaced output. Also, none of the more sophisticated carriage control features (such as "PB boldface") will work without extra programming. And right-justified margins won't work either. However, for most correspondence this method works wonderfully.

David E. Krebs
New York, New York

We tried this trick on several of our high-priced printers without much success. However, Mr. Krebs's letter was indeed proportionally spaced (he used a Juki 6100). We normally don't print tricks without extensively testing and verifying them, but this one seemed so easy (and relatively logical), and his letter looked so attractive that we're passing it along. Let us know.

Fast Turbo Screen Updates

If it needs to be done, you can do it in Turbo Pascal! The need to produce fast screen displays of character strings caused me to look more closely at Turbo Pascal's ability to use customized in-line machine code. WRITELN was not quite fast enough, so I decided to write directly to the video

```

program fastdisp ;

type astring = string [255] ;
var str1,str2 : astring ;
    row,col : integer ;

procedure fastdisplay(var s: astring ; var r,c : integer);

begin
    INLINE (
$B/$5E/$04/ { mov bx,[bp+4] ; address of col var }
$B/$3F/ { mov di,[bx] ; get the col value }
$4F/ { dec di }
$B/$5E/$08/ { mov bx,[bp+8] ; address of row var }
$B/$07/ { mov ax,[bx] ; get the row value }
$48/ { dec ax }
$B/$5E/$0C/ { mov bx,[bp+12] ; address of string }
$32/$ED/ { xor ch,ch }
$8A/$0F/ { mov cl,[bx] ; get string length }
$80/$F9/$00/ { cmp cl,0 ; test for null string }
$74/$40/ { je exit }
$C4/$76/$0C/ { les si,[bp+12] ; point to string }
$46/ { inc si ; point to first char }
$BB/$40/$00/ { mov bx,40h ; check video card type }
$0E/$C3/ { mov es,bx ; current column setting }
$26/$F7/$26/$4A/$00/ { mul es:4Ah ; set card mode }
$03/$F8/ { add di,ax }
$D1/$E7/ { shl di,1 ; attribute byte }
$26/$8B/$16/$63/$00/ { mov dx,es:63h }
$83/$C2/$06/ { add dx,6 ; point to status port }
$B8/$00/$B8/ { mov ax,0B800H ; first try color card }
$26/$8B/$1E/$10/$00/ { mov bx,es:10h ; check for card type }
$81/$E3/$30/$00/ { and bx,30H }
$83/$FB/$30/ { cmp bx,30H ; test for mono card }
$75/$03/ { jne setcard }
$B8/$00/$B0/ { mov ax,0B000H ; else is a mono card }
$8E/$C0/ { setcard: mov es,ax ; point es to video }
$EC/ { testlow: in al,dx ; get status }
$A8/$01/ { test al,1 ; is it low ? }
$75/$FB/ { jnz testlow ; no, keep checking }
$FA/ { cli ; turn off interrupts }
$EC/ { testhi: in al,dx ; get status }
$A8/$01/ { test al,1 ; is it high ? }
$74/$FB/ { jz testhi ; no, keep checking }
$A4/ { movsb ; proper time to display }
$47/ { inc di ; skip attribute byte }
$E2/$F1/ { loop testlow ; end of string ? }
$FB/ { sti ; turn interrupts on }
    )
end;

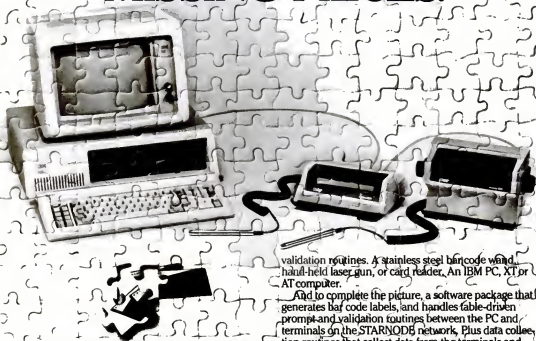
begin { main program used to test fastdisplay routine }

```

(Figure 3 continues)

Figure 3. A FASTDISPLAY procedure in Turbo Pascal to write strings directly to screen memory. In-line machine code uses the row, column, and string address passed as parameters.

THE ONLY PC BAR CODING SYSTEM WITH ALL THE MISSING PIECES.



Picture an IBM PC-based bar coding system with all the hardware and software you need. All in one low-cost package. Well, what you see is what you get with our new STARNODE™ PC Bar Code Data Collection System.

Quite simply, there's nothing else like it.

The hardware comes with all the right pieces: A STARNODE Data Collection Interface that supports as many as 4,096 terminals on a single, economical twisted wire network. An intelligent SCANSTAR™ 200 Bar Code Terminal with a display of two lines of 40 characters each, and 8K RAM for storage, prompt, and

validation routines. A stainless steel bar code wand, hand-held laser gun, or card reader. An IBM PC, XT or AT computer.

And to complete the picture, a software package that generates bar code labels, and handles table-driven prompt and validation routines between the PC and terminals on the STARNODE network. Plus data collection routines that collect data from the terminals and write them to disk files compatible with popular IBM packages such as Symphony™, 1-2-3™, dBase II™, dBase III™, and GOLDENGATE™.

It all fits together perfectly, including the price. For example, a bar coding system with 25 SCANSTAR 200 terminals and an IBM XT computer costs just \$28,550. Or short-term leasing can be arranged at a special introductory price of \$1,145 a month.

For more information about the new STARNODE PC Bar Code Data Collection System, call Computer Identics at 1-800-622-2633. And you'll never be puzzled again.

**computer
identics**

5 Shawmut Road, Canton, MA 02021
Tel. (617) 821-0830 • TWX 710-348-0828

STARNODE and SCANSTAR are trademarks of Computer Identics Corporation. Symphony and 1-2-3 are trademarks of Lotus Development Corporation. dBase II and III are trademarks of Ashton-Tate, Inc. GOLDENGATE is a trademark of Culbert Software, Inc.

CIRCLE 306 ON READER SERVICE CARD

```

str1 := 'TURBOTURBOTURBOTURBOTURBOTURBOTURBOTURBOTURBOTURBOTURBOTURBOT';
str2 := 'fastdisplayfastdisplayfastdisplayfastdisplayfastdisplayfastdisplay';
clrscr;
for row := 1 to 24 do begin
  gotoxy (1,row);
  write (str1); { Regular Turbo Display }
end;
for row := 1 to 24 do begin
  col := 1;
  fastdisplay(str2,row,col); { Fast Display }
end;
end.

```

(Figure 3 ends)

screen memory locations using 8088 assembly language. It's helpful to use ASM or DEBUG to generate the machine code. In the listing shown in Figure 3, the actual assembly language instructions appear to the right as comments.

I have included a short demonstration program at the end of the program to show how fast the display update is over the WRITELN statements.

Steve Hall
Beaverton, Oregon

When you wrote that Turbo Pascal can do anything, I didn't expect you to back up this claim with 38 lines of in-line assembly language!

Although I'm an assembler fanatic myself, when working with a high-level language I prefer to stay within its confines.

An alternative fast screen display procedure without assembly language code is

WRITELN was not quite fast enough, so I decided to write directly to the video screen memory locations using assembly language. It's helpful to use ASM or DEBUG to generate the machine code.

shown in Figure 4. This one uses Turbo Pascal's absolute memory references to

base an array at the monochrome and color display addresses. When data is moved into these arrays, it appears on the display. Note, however, that it is somewhat slower than your routine and causes some colored snow because of the absence of horizontal retrace checks.

Share Your Power

Tell the world about your latest technical tips for hardware and software applications through Power User, and we'll pay you \$50 for your trouble, plus an extra \$25 if you submit it on a disk.

If you send a disk, please include a printout of your submission to ensure against damage in transit. Mail your contributions to Power User, PC Magazine, One Park Avenue, New York, New York 10016.

```

procedure fastdisplay(var s: astring; var r,c : integer);

```

```

type screen80 = array[1..25,1..80,1..2] of char;
var monodisp : screen80 absolute $B000:0000;
    colodisp : screen80 absolute $B800:0000;
    i,j,mode : integer;

begin
  j := length(s);
  mode := mem[$0040:$0049]; { get video mode }
  if (mode = 2) or (mode = 3) then { color }
    for i := 1 to j do colodisp[r,c + i - 1,1] := s[i];
  if mode = 7 then { monochrome }
    for i := 1 to j do monodisp[r,c + i - 1,1] := s[i];
end;

```

Figure 4. Another FASTDISPLAY procedure demonstrating the use of absolute memory references in Turbo Pascal. This procedure may be substituted in Steve Hall's program to see the difference in speed.

What's a way to buy! Fantastic low prices

HARDWARE

CURTIS SURGE PROTECTORS	
Diamond	32.95
Ruby	59.95
Emerald	42.95
Sapphire	49.95
DATASHIELD POWER BACK UP	
PC-200 200 watt (for PC)	295.00
XT-300 300 watts (for XT)	399.00
AT-500 500 watt	649.00

DCA INC.	
Imma Board 3278 Emulation	899.95
EVEREX	
Expansion Chassis	695.00

IMI	
Mouse w/PC paintbrush	119.95
KEYTRONICS	
New! KB 5151 keyboard	169.95

KENSINGTON	
MasterPiece	92.50

KOALA	
Koala Pad	89.95
Speed Key System	99.95

MOUSE SYSTEMS	
PC Mouse with PC Paint	139.95

64K Memory Upgrade Set	7.95
256K Memory set	44.95
Intel 8087-3	109.95
Intel 80287	199.00
<i>Quadrify prices available</i>	

ORCHID TECHNOLOGY	
PC Turbo-186	579.00
Daughterboard 8K	Call
PC Turbo-186 with 8087*	749.95
support daughterboard	749.95
<i>* 8087 optional</i>	

DISK DRIVES	
TANDON TM-100-2 DS/DD	
disk drive	104.95
TEAC 55B 1/2 Height DS/DD	
disk drive 55B	96.50

HARD DISK DRIVES FOR IBM

HIGH SPEED INTERNAL HARD DRIVES FOR IBM AT	
Complete with software, Mounting rails & instructions. 30Msec Average Access Time.	
1D-40AT 51MB 132MB format (1295.00)	
1D-60AT 72MB 132MB format (1495.00)	
HIGH SPEED INTERNAL HARD DRIVES IBM XT w/CROSSLATER	
51MB 132MB formatted	1495.00
72MB 132MB formatted	1695.00

INTERDYNE	
Internal 10MB tape backup for IBM PC/XT	449.95
IOMEGA BERNOLLI BOX	
20 MB (2.10 MB in cabinet)	2469.00
FIXT Autoboot ROM 1/PC	69.95

POWER SUPPLY	
130W Internal Power Supply	89.95
RODIME	
160MB 3 1/2" shock mounted hard drive. Complete with controller	524.95

TALLORASS	
Hard drive sub system with backup. New! TG-5025	2795.00
<i>Includes interface card for IBM-PC</i>	

TAPE BACK UP SYSTEMS

Sygen 45MB Internal (XT, AT)	Call
Sygen 45MB External (XT, AT)	895.00
Teacmar 60MB External (XT, AT)	1495.00
<i>Internal Tape Backup Units require 130W power supply.</i>	

DISPLAY CARDS	
EVEREX	
Graphics Edge	309.95

HERCULES	
Color Card	159.95
Graphics Card (Mono)	309.95

PARADISE	
Modular Graphics Card	269.95
SIGMA	
Color 400T i/Taxan 440	Call
Color 400 i/Princeton SR-12	Call
TECMAR Graphics Master	469.00

MEMORY EXPANSION CARDS	
AST RESEARCH	
AST 6-PACK PLUS 54K	249.95
AST 6-PACK PLUS 384K	309.95
<i>For game port option add 34.95</i>	
QUADRAM QUADBOARD	
New! Expanded Quadboard 64K	209.95
384K	249.95

TALLTREE SYSTEMS	
J RAM-2 w/parallel, serial & clock I/O	249.00
New! J RAM-3 256K	269.00

TECMAR	
CAPTAIN-64K	194.50
MEMORY-384K	309.95

MEMORY EXPANSION CARD FOR THE IBM AT	
Teacmar Maestro 640K	449.00
AST Advantage	Call
Quadram Quadmeq 128K	329.00
Tall Tree J-RAM AT 8K with Software	209.00

MODEMS	
ANCHOR AUTOMATION	
Volksmodem 12	179.95
Cable for PC, Compaq	11.95

HAYES	
Smartmodem 1200 RS-232	399.95
Smartmodem 1200B with Smartcom II	359.95
Smartmodem 2400 Baud	639.00

NOVATION	
1200 + Internal Modem	329.95
1200 + External Modem	329.95
Novation 2400 Modem	599.95
<i>Includes Mite software</i>	

VEN-TEL	
PC 1/2 Card Modem (internal) w/Crosslat XVI	389.95
1200 Plus-External 300/1200	369.95

MONITORS	
PRINCETON	
HX-12 RGB Color	449.95
MAX-12 Amber TTL	179.95
SR-12	599.95
SR-12 w/Scan Doubler	795.00

QUADRAM	
Amberchrome 12" Amber	149.95

TAXAN	
440-RGB	549.95
800 board for 440	379.95
420-RGB color	419.95
420-RGB color	429.95
122-12" TTL - Amber	139.95
122-12" TTL - Green	149.95

AMDEK	
600 Color RGB	419.00
700 Color RGB	459.95
710 Color RGB	569.95

PRINTERS	
BROTHER	
HR-15 17 CPS	369.00
HR-25 23 CPS	649.00
HR-35 36 CPS	899.00
Tractor Feed HR-15, HR-25	124.95
Sheet Feeder HR-15/25	199.95

COMREX	
CR-11 19 CPS	299.00
CR-3 23 CPS	399.00
CR-IV 36 CPS	569.00

EPSON	
CALL FOR OUR LOW PRICES.	
JUKE	
6100 18 CPS Letter Quality	379.95
6300 40 CPS	899.95

IBM® HARD DRIVE SYSTEMS

IBM PC SYSTEMS

- IBM PC 256K • 10MB internal hard drive installed • 360K DS/DD floppy disk drive

\$2250*

- IBM-PC 256K • 10MB internal hard drive • 360K 1/2 height floppy • 1.2MB 1/2 height floppy (AT compatible)

\$2695*

IBM XT SYSTEMS

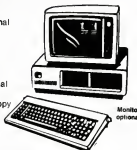
- IBM XT 256K • 360K drive • 10MB VI hard drive

\$2495*

- IBM XT 256K • 360K drive • 10MB internal hard drive • 10MB internal tape back-up.

\$2995*

*For above systems with 20 MB internal hard drive add \$200.



IBM AT SYSTEMS

- IBM AT 512K • 1.2 MB Floppy Drive • 20 MB CMI hard drive (40Msec)

\$3895

- IBM AT 512K • 1.2 MB floppy drive • 72 MB (59.8 formatted) Priam hard drive (30 Msec).

\$4850

NEC	
8850 letter quality	Call
3550 letter quality 33 CPS	1039.00
2050 letter quality 18 CPS	899.95
Trektor Feed 3550/2050	209.95

OKIDATA	
OKI-192	349.95
OKI-93	499.95
OKI-93	569.95
OKI 2410	1995.00

OLYMPIA	
Compact R/O parallel/serial letter quality	299.95

SILVER REED	
EXP-550 19 CPS	439.95
EXP-770 36 CPS	799.95
Tractor Feed for EXP-550	124.95

TEXAS INSTRUMENTS	
855 with Tractor Feed	749.95

TOSHIBA	
P-351 Printer (288 cps)	1149.00
P1340 Printer	579.00

LASER PRINTERS	
APPLE Laserwriter	Call
HP Laserjet	Call
QUADRAM Quadlaser	Call

PLOTTERS	
SWEET-P 6-pen plotter	795.00
SWEET-P 1-pen plotter	295.00

FLOPPY DISKS	
SS/DD	DS/DD
KODAK 5 1/4" (10 pk)	16.95
IBM 5 1/4" (10 pk)	19.95
MAXELL 5 1/4" (10 pk)	26.95
FUJII 5 1/4" (10 pk)	15.95
FUJII 5 1/4" (10 pk)	18.95
POLAROID DS/DD	18.95

For quantity prices, please call

SOFTWARE

WE STOCK A LARGE SELECTION OF SOFTWARE FOR TITLES NOT LISTED HERE, PLEASE CALL US FOR OUR LOW PRICES.

ALPHA	
Keywords "TOP RATED"	Special

APPLIED SOFTWARE	
Versaflex XL	79.95

ASHTON TATE	
D base II	299.95
Ashton Tate D BASE III	349.95
Ashton Tate Framework	349.95

BORLAND	
Turbo Pascal 3.0	36.50
Side Kick (protected)	29.95
Slide Kick (non-protected)	44.95
Super Key	36.50
Turbo Pascal w/8087 support	57.95

BRODERBUND	
Bank ST Writer	54.95

DATA TRANSFORMS	
Fortrix	Call

DOW JONES	
Investment Evaluator	99.95
Market Analyzer (w/ color card)	229.95
Market Manager plus	164.95
Spread Sheet Link	164.95

FOX & GELLER for D Base	
Quick Code	139.95
Dutil	44.50
D Graph	149.95
<i>*For D Base II or III, Please specify</i>	
OZ (req 256K & color card)	209.95
R Graph (for R Base 4000)	149.95

FUNK SOFTWARE	
Sideways	44.95

HARVARD SOFTWARE	
Harvard Project Manager	209.95
New! Total Project Manager	259.95

HARVARD ASSOC.	
PC Logo	99.00

IMI	
PC Paintbrush requires mouse & color card	99.95

INFOCOM	
Cornerstone	279.95

without ever compromising on service!

PC OCT. 1, 1985

COMPAQ PORTABLE SYSTEMS



- 256K
- Two DS/DD disk drives
- Built-in hi-res monitor with graphics
- Parallel printer card
- DOS

Call or write.

COMPAQ PORTABLE HARD DRIVE SYSTEMS

COMPAQ 256K with 10MB Drive and 1-360K Floppy\$2495**

COMPAQ 256K with 10MB Drive and 2-360K 1/2 Hi. Drives\$2750**

COMPAQ 256K with 20MB Hard Drive and 1-360K Floppy\$2695**

COMPAQ DESK PRO, **Call or write.**

MICROSCIENCE INTERNAL HARD DRIVES FOR IBM PC AND XT

Internal 1/2 height hard drive with Western Digital short controller card 1 yr. warranty

10MB \$489.00 20MB \$595.00

FREE! ALPHA Keyways Keyboard Macro Program with Microscience 10MB or 20MB hard drive. A \$89.95 value.

TURN 1 IBM-PC INTO 4

Turn your IBM PC or XT into a true Multi-user system with Multi-PC. Up to 4 users can share a single PC, running the same or different software all under PC DOS. Ideal for the small office. **Call for low price.**

MSI CARTRIDGE BACK-UP SUBSYSTEM

Low cost high capacity 25MB cartridge tape back-up system for the IBM PC/XT complete in cabinet with power supply. Connects to IBM floppy controller card. Will not use a slot in your PC. Back-up and restore individual files or an entire disk.

Now Only \$888.88

INNOVATIVE SOFTWARE
Smart Software System\$95.00

KENSINGTON/WESTERN UNION
Instant Mail Manager\$9.95

KOALA
Executive Presentation\$9.95

LIFE TREE
Volkswriter Deluxe\$159.95

LIGHTYEAR
LightyearCall

LIVING VIDEOTEK
Think Tenk (req. 256K)\$109.95

LOTUS
1-2-3In Store Only
SymphonyIn Store Only

MECA
Managing Your Money\$9.95
Jim Fixx Running Program\$4.95

MENLO PARK
In Search\$39.95

MICRO DATA BASE SYSTEMS
Knowledge Man 1.7\$39.95

MICRO PRO
Wordstar Pro Pack\$39.95
Wordstar 2000\$39.95

MICROIM
R Base 5000\$39.95
Newt Clout 2.0\$39.95

MICROSOFT
Chart\$154.95
New! Flight Simulator\$4.95
Multiplan\$129.95
Word 2.0\$234.95
Project\$159.95

MICROSTUF
Croetalk XVI\$99.95
Remota\$109.95

MONOGRAM
Dollars and Sense w/forecast\$109.95

MULTIMATE
Ultimate Version 3.3\$49.95

NOUMENON
Intuit Integrated Software\$9.95

OSPREY ACCOUNTING SYSTEM
Accounts Receivable\$219.95
Accounts Payable\$219.95
General Ledger\$219.95
Inventory Control\$219.95
Order Entry\$219.95
Budget & Finance Report\$219.95
Sales Invoicing (Req. Acc Rec)\$219.95

PETER NORTON
Norton Utilities 3.0\$49.95

POWER BASE SYSTEMS
Power Base 2.1Call

PROGRAMMER'S CORNER
Lattice-C Compiler\$295.95
P-Fix 86 Plus Debugger\$299.95
C-Food Stores/Storage Board\$108.95
Morgan Prof. Basic\$79.95
Lattice Windows\$219.95
Trace 86\$99.95
Panel for Lattice-C\$219.95
Halo (Lattice-C)\$149.95
P-Mate Text Editor\$159.95
B-Trieve\$195.50
Plink-86 Overlay Linker\$299.95
X-Trieve\$169.95
Mark Williams C\$95.00

QUATERDECK
Desq\$139.95

ROSESOFT
Prokey 3.0\$49.95

SCARBOROUGH SYSTEMS
Your Personal Network\$69.50

SIMON & SCHUSTER
Typing Tutor III\$49.95

SOFT LOGIC
Double DOS\$99.00

SORCUM
Supercalc 3 Release 2\$179.50
Super Project\$189.00

SOFTSTYLE
Printworks\$49.95
Set FX +\$44.50

SOFTWARE PUBLISHING
PFS FILE\$49.95
PFS Graph\$49.95
PFS Report 79.95 PFS Write\$49.95

SSI
Word Perfect Vars. 4.0\$219.95

STARBRIDGE TECHNOLOGY
Starbridge DOS\$39.95

STATE-OF-THE-ART
The Bookkeeping System\$59.95
General Ledger\$39.95
Accounts Payable\$39.95
Accounts Receivable\$39.95
Inventory Control\$39.95
Order Entry\$39.95
Budget & Finance Report\$39.95
Sales Invoicing (Req. Acc Rec)\$39.95

THE SOFTWARE GROUP
Enable\$299.95

THOUGHTWARE
Self! Sell! Sell!\$299.95

VM COMPUTING
Relay Communication\$99.50

WARNER SOFTWARE
Desk Organizer\$99.95

GRAPHIC SOFTWARE

BPS
Business Graphs\$219.95
Overhead Express\$129.95

BRIGHTBILL ROBERTS
Grafix Partner\$49.95

DECISION RESOURCES
ChartMaster\$239.00
SignMaster\$179.00

ENERTRONICS
Energraph\$229.95
Plotter Option\$65.00

IBM PCjr. CORNER

MICROSOFT PCjr. Booster
128K RAM Mouse and Flight Simulator\$139.95

KOALA Koala Pad Touch Tablet for PCjr. with software\$34.95

SORCUM Supercalc Superwriter for PCjr.\$99.95

MICRO PRO WordStar for PCjr.\$99.95

TECMAR PCjr. Captain 128K w/Parallel Port\$129.95

47st. Computer

Computers and Business Equipment

67 W. 47th St. • 115 W. 45th St.

NYC CA LIC. # 800189 / 691850

NYC CA LIC. # 800191

116 Nassau St. Near City Hall and the World Trade Center
Computer Annex around the corner, 39 Ann Street

Mail Order Address: 36 E. 19th St., New York, N.Y. 10003

IN NEW YORK **1-212-260-4410**

STATE CALL
TOLL-FREE OUT-OF-STATE **1-800-221-7774**

NASSAU STREET STORE 45th and 47th St. STORES
1-212-608-6934 1-212-398-1410

Store Hours: Sunday 10-4, Mon. thru Thurs. 9-6, Friday 9-2

- No surcharge for credit cards
- Prompt and efficient service
- Knowledgeable and experienced sales staff.

We accept MC, Visa, American Express & personal checks (no delays if approved). Minimum shipping and handling \$5.95. Software found to be defective will be replaced immediately. Defective hardware will be repaired or replaced at our discretion within the warranty period of manufacturer. Defective items must be sent to 36 East 19th Street, New York, N.Y. 10003. Alt. Service Dept. Prices herein are for mail and phone orders only. Store prices may differ. Some items are subject to availability. Due to manufacturers price fluctuations, the prices may change beyond our control. This ad supersedes all previous PC ads. Not responsible for typographical errors.

Keep in touch with the latest items on the market and our up-to-date sale prices by checking our weekly ads in the National editions of the N.Y. Times and Wall Street Journal.

IBM is a registered trademark of International Business Machines Inc.
PC Magazine Oct. 1, 1985 Aug. 6 1985

What the world really needs is a 69 cent Double Sided, Double Density Diskette with a LIFETIME WARRANTY!

And DISK WORLD! has it.

**Introducing Super Star Diskettes:
the high quality diskette with
the lowest price
and the best LIFETIME WARRANTY!**

In the course of selling more than a million diskettes every month, we've learned something: higher prices don't necessarily mean higher quality.

In fact, we've found that a good diskette manufacturer simply manufactures a good diskette, no matter what they charge for it. (By way of example, consider that none of the brands that we carry has a return rate of greater than 1/1,000th of 1 percent!)

In other words, when people buy a more expensive diskette, they aren't necessarily buying higher quality. The extra money might be going toward flashier advertising, snazzier packaging or simply higher profits.

But the extra money in a higher price isn't buying better quality. All of the good manufacturers put out a good diskette. Period.

How to cut diskette prices ...without cutting quality.

Now this discovery posed a dilemma: how to cut the price of diskettes without lowering the quality.

There are about 85 companies claiming to be "diskette" manufacturers.

Trouble is, most of them aren't manufacturers. Rather they are fabricators or marketers, taking other company's components, possibly doing one or more steps of the processing themselves and pasting their labels on the finished product.

The new Eastman Kodak diskettes, for example, are one of these. So are IBM 5 1/4" diskettes. Same for QYSAN, Polaroid and many, many other familiar diskette brand names. Each of these diskettes is manufactured in whole or in part by another company!

So, we decided to act just like the big guys. That's how we would cut diskette prices... without lowering the quality.

We would go out and find smaller companies to manufacture a diskette to our specifications, specifications which are higher than most... and simply create our own "name brand" diskette.

Name brand diskettes that offered high quality at low prices.



Super Star diskettes are sold in multiples of 50 only. Diskettes are shipped with white Tyvek sleeves, reinforced hubs, user ID labels and write-protect tabs.

Boy, did we get lucky. Our Super Star Diskettes are the same ones you've been using for years...without knowing it.

In our search for the low priced, high quality diskette of our dreams, we found something even more interesting.

We found that there are several manufacturers who don't give a hoot about the consumer market for their diskettes. They don't spend millions of dollars in advertising trying to get you, the computer user, to use their diskettes.

Instead, they concentrate their efforts on turning out the highest quality diskettes they can... because they sell them to the software publishers, computer manufacturers and other folks who in turn put their name on them... and sell them for much higher prices to you!

After all, when a software publisher or computer manufacturer or diskette marketer puts their name on a diskette, they want it to work more after time, everytime. (Especially software publishers who have the nasty habit of copy-protecting their originals!)

Super Star Diskettes. You already know how good they are. Now you can buy them...cheap.

Well, that's the story.

Super Star diskettes don't roll off the boat from Pago-Pago or emerge from a basement plant just east of nowhere.

Super Star diskettes have been around for years... and you've used them for years as copy-protected software originals, unprotected originals. Sometimes, depending on which computer you own, the system master may have been on a Super Star diskette. And maybe more than once, you've bought a box or two or more of Super Star diskettes without knowing it. They just had some "big" company's name on them.

Super Star diskettes are good. So good that a lot of major software publishers, computer manufacturers and other diskette marketers buy them in the tens or hundreds of thousands.

We buy them in the millions.

And then we sell them to you.

Cheap.

When every little bit counts, it's Super Star Diskette.

You've used them a hundred times, under different names.

Now you can buy the real McCoy, the same diskette that major software publishers, computer manufacturers and diskette marketers buy... and call their own.

We simply charge less.

Super Special!

Order 50 Super Star Diskettes and we'll be happy to sell you an Amaray Media-Mate 50 for only \$8.75, shipping included, a lot less than the suggested retail price of \$15.95.



Regular DISK WORLD! price: \$9.69 ea.
+ \$2.00 Shpg.

DISKETTE STORAGE CASES

DISK CADDIES

The original flip-up holder for 10 5 1/4" diskettes. Beige or Gray only.

\$1.65 ea. + 20 Shpgn.

DISKETTE 70 STORAGE

Dust-free storage for 70 5 1/4" diskettes. Six dividers included. An excellent value.

\$9.95 ea. + \$3.00 Shpgn.



HOURS:

Harman: 8AM-6PM Central Time, Monday through Friday

MCI MAIL: 24 hours a day.

HOW TO ORDER:

ORDERS ONLY:

1-800-621-6827

(In Illinois: 1-312-256-7140)

INQUIRIES:

1-312-256-7140

FOR FASTEST SERVICE, USE NO-COST MCI MAIL. Our address is DISK WORLD, P.O. Box 1, FREE MCI MAIL, letter. No charge to you. (Situation permitting, we'll ship these orders in 24 hours or less.)

SHIPPING: 5 1/4" & 3 1/2" DISKETTES—Add \$3.00 per each 100 or fewer diskettes. **OTHER ITEMS:** Add shipping charges as shown in addition to other shipping charges. **PAYMENT:** VISA, MASTERCARD and Prepaid orders accepted. **COD ORDERS:** Add additional \$5.00 special handling charge. **APO, FPO, AA, HI & PW ORDERS:** include shipping charges as shown and additional 5% of total order amount to cover RPA and insurance. We ship only to United States addresses except for those listed above. **TAXES:** Illinois residents, add 8% sales tax.

MINIMUM ORDER: \$35.00

The Super Star LIFETIME WARRANTY!

Super Star Diskettes are unconditionally warranted against defects in original material and workmanship so long as owned by the original purchaser. Returns are simple: just send the defective diskettes with proof of purchase, postage paid by you with a short explanation of the problem, and we'll send you the replacements. (Incidentally, coffee stained diskettes and diskettes with staples driven through them don't qualify as "defective.")

WE WILL MEET OR BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES SUBJECT TO THE SAME TERMS AND CONDITIONS.

DISK WORLD!, Inc.

629 Green Bay Road
Wilmette, Illinois 60091



User-to-User

Readers use this forum to help one another by passing along questions, solutions, comments, and complaints.

Better BASIC Titles

No matter how much you use music and fancy colors, you just can't make very interesting titles with BASIC's small character sizes. The CHAR.BAS program in Figure 1 lets you create characters of any size. The program reads data directly off the screen with the P(X,Y)=POINT(X,Y) function in line 190 and then draws filled boxes to the scale the user enters. For a different text and background color, change the C=0 in line 210 to C=1 or C=2.

Robert Lawlor
Taylorsville, Utah

We adapted the program by adding some bells and whistles, one of which is the PRESET(X,Y) in line 190. This erases the text as the program reads the characters you've typed onto the screen. While you don't need this to make the program work, it is always a good idea to have something moving or going on so the user knows the program hasn't crashed when it looks like it's just sitting there frozen. To produce another variation, change line 210 to read IF P(X,Y)=0 THEN 230 ELSE C=3 and

then change the "BF" at the end of line 220 to just read "B" (omitting the quotation marks, of course)—this will draw with hollow rather than filled boxes. Or, eliminate the BF and the comma before it to draw characters out of diagonal lines.

Fast BASIC PrtSc

When I saw Jim Anes's BASIC screen dumper, PRNTSCRN.BAS, in the August 6 User-to-User column (Volume 4 Number 16), I remembered a tip I learned from Joe Fleming, the sysop of the Tampa IBM PC BBS, which was included in PC Magazine's list of 75 of some of the nation's top bulletin boards (Volume 4 Number 12). The trick is in lines 150-160

```
100 ' PrtScrn Subroutine
110 PRINT "Hit any key"
120 WHILE INKEY$="" :WEND
130 GOSUB 150
140 END
150 X!=-51973.8:Y=VARPTR(X!)
160 CALL Y:LPRINT CHR$(12)
170 RETURN
```

The real number -51973.8 is stored inter-

```
100 ' CHAR.BAS - by Robert Lawlor - adapted by PC
110 CLEAR:SCREEN 1:COLOR 1,0:CLS:KEY OFF
120 INPUT "Enter X-size (from 1 to 40): ",XS
130 INPUT "Enter Y-size (from 1 to 24): ",YS
140 IF XS>40 OR YS>24 OR XS<1 OR YS<1 THEN 110
150 CLS:LOCATE 25,13:PRINT "Type a message";
160 DIM P(320,8):LOCATE 1,1:LINE INPUT M$
170 P=320/XS:IF LEN(M$)*8<P THEN P=LEN(M$)*8
180 FOR X=0 TO P:FOR Y=0 TO 7
190 P(X,Y)=POINT(X,Y):PRESET(X,Y):NEXT Y
200 CLS:FOR X=0 TO P:FOR Y=0 TO 7
210 IF P(X,Y)=0 THEN C=0 ELSE C=3
220 LINE(X*XS,Y*YS)-(X*XS+XS,Y*YS+YS),C,BF
230 NEXT Y:NEXT X:LOCATE 25,15:PRINT "Escape to end";
240 K$=INPUT$(1):IF K$=CHR$(27) THEN END ELSE 110
```

Figure 1: CHAR.BAS program to produce variable-size characters on graphics screens only. To produce an interesting hollow box variation, change line 210 to read IF P(X,Y)=0 THEN 230 ELSE C=3 and change "BF" at the end of line 220 to "B" (omitting the quotation marks).

MAGNUM P.C.

800-544-4354

ORDERS
ONLY

COMPUTERS

IBM PC, XT OR AT YOU CONFIGURE	SAVE
COMPO DESKPROPS & PORTABLES	CALL
ERICSSON PORTABLE PC	NEW
AT&T 6300-PC	SAVE

EXPANSION CARDS

AST SIX PAC PLUS (64K)	269
ADVANTAGE/PREVIEW	399/279
EVEREX GRAPHICS EDGE	319
HERCULES GRAPHICS CARD	329
COLOR CARD	166
IRMA 3278 EMULATOR	799
ORCHID PC BLOSSOM & TURBO	CALL
PARADISE MODULAR GRAPHICS CARD	NEW
PROFIT SYSTEMS MULTIGRAPH	CALL
PERSTY TIME SPECTRUM	269
QUADRAM QUADBOARD (OK)(64K)	225/269
STB ALL PRODUCTS	CALL
TECMAR GRAPHICS MASTER	459

DISK DRIVES

FULL HEIGHTS (FOR IBM)	FROM 110
HALF HEIGHTS (FOR IBM)	FROM 99
ALLOY PC-STDRICSTDR	CALL
AMPEX	CALL
EVEREX EXPANSION CHASIS	775
EXPANSION W/ 10 - 20 MB	FROM 1395
CORE AT 20 - AT 72	FROM 1249
IOmega BERNOLLI PLUS	2550
KAMERMAN LABS	CALL
MASTERFLIGHT SYSTEM	CALL
KODAK 3.5 MB W/BACKUP SOFTWARE	662
PEACHTREE TECHNOLOGIES	FROM 699
TALKBARS HARD DRIVES & Tapes	CALL

PC-JR ENHANCEMENTS

AST JR COMBO	CALL
QUADRAM DRIVE 2 ENHANCEMENT	475
QUAD MEM JR	219
RACORE 10 MB ENHANCEMENT	SAVE
TECMAR JR CAPTAIN	325

PRINTERS

CANON	CALL
EPSON FX RX LX LQ	CALL
OKIDATA ALL MODELS	BEST PRICES
QUME	CALL
SMITH CORONA	CALL
STAR-MICRONICS SG-10/15	243/407
TOSHIBA P331-P3340	1225/579

MONITORS

AMDEK 310 (IBM PLUG-IN - AMBER)	169
PGS MAX 126X-12	169/489
TAXAN ALL MODELS	CALL

SOFTWARE

SYMPHONY	475	COPY II PC	35
MULTIMATE	249	D-BASE III	399
SAMNA III	CALL	FRAMEWORK	399
ENABLE	SAVE	LOTUS 1-2-3	309

MODEMS

HAYES SMART MODEM 300/1200	199/399
1200B/1200	349/379
2400 BAUD MODEM	CALL
TRAVEL 1000	CALL

ACCESSORIES

CHIPS 64K - SET OF 9	18
256K - SET OF 9	59

DISKETTES

BASF 5 1/4" SS/DD (Each-lots of 10)	1.20
5 1/4" OS/DD (Each-lots of 10)	1.75
5 1/4" OS/DD IBM-AT (Each-lots of 10)	4.35
MAXELL 5 1/4" OS/DD (Each-lots of 10)	2.25
VERBATIM 5 1/4" OS/DD (Each-lots of 10)	2.25

1-800-544-4354

ORDERS
ONLY

FOR INFORMATION - (404) 441-3112
5665 PEACHTREE CORNERS EAST B-2
NORCROSS, GEORGIA 30071
AVAILABILITY AND PRICES SUBJECT TO CHANGE
APPROVED CORPORATE ACCOUNTS WELCOME

DISKETTES

introducing **BONUS**

DISKS WITH A LIFETIME WARRANTY

SS/DD 82¢ EACH

SPECIAL '9.10 Box of 11

DS/DD 98¢ EACH

'10.80 Box of 11



1 BOX MINIMUM

RIBBONS— EPSON MX80—

'3.99 EACH

OKIDATA MICROLINE 80—'1.99 EACH

RING KING—

Disk Holder-Smoke

Holds up to 75 SPECIAL

5 1/4" Diskettes '16.99



5 1/4" DISKETTE MAILERS— .50 EACH

CALL TOLL FREE 1-800-324-8130

IL. CALL COLLECT 312-455-4488



Disk Jockey

P.O. BOX 35146

CHICAGO IL • 60635-0146

MASTERCARD VISA C O D

CIRCLE 239 ON READER SERVICE CARD

WE RENT MICROS

**IBM PC; IBM XT
IBM AT**



- Rentals
- SONY 25" Video
- Installation
- Service
- Low yearly, monthly and weekly rental rates

We rent modems, HP plotters, dot matrix and letter quality printers.

Immediate Delivery!

609-662-1010

MICRORENTALS

VISA and MasterCard accepted

CIRCLE 332 ON READER SERVICE CARD

USER-TO-USER

nally as the coding for a call to INT 5, the PrtScr function. After finding the location of this value on memory with VARPTR, calling the address returned by VARPTR triggers the PrtScr.

Jerry Redman
Tampa, Florida

Strange, but it works. Incidentally, if readers know about any unusual or extremely useful or innovative bulletin boards, drop a postcard with the details to our Technical Editor, and we'll try to list them either in a future issue of PC Magazine or on PC Magazine's own IRS bulletin board.

Bring 'em Back Alive

The IBM BASIC manual explains four ways to use the DELETE command, but ignores a fifth, undocumented way that can erase your entire program with a single flick of the Enter key.

If you accidentally type the word DELETE without any line numbers after it and then hit the Enter key, the program will disappear. Because of this, always use the Escape key to cancel an aborted command rather than the Enter key.

Mike Gains
Belpre, Ohio

This is an insidious bug—typing DELETE with no line numbers after it is the same as typing NEW. However, if you do accidentally type either NEW or DELETE and hit the Enter key, you can reconstruct the program, almost all of which remains in memory. The process, as amplified from its original explanation in User-to-User (PC Magazine, Volume 3 Number 2), is:

1. Right after you realize what you've done, type

PRINT CHR\$(14)

and hit Enter. A musical note will appear on the screen.

2. Hit the up-arrow key twice to move the cursor up to the line with the musical note on it and then hit the Ins key.

3. Type the number 1 and then an apostrophe (a single-quote); then hit Enter.

4. Pick a new filename and then you can type either

LIST, "filename"

or, alternatively, you can type

SAVE "filename",a

(substituting your new filename between the quotes), which will save the resurrected program as an ASCII file. The first line of your original program will vanish, and you'll find a garbled line somewhere near the beginning and the end, but you can edit these later.

Important: Don't fiddle with the first two lines before you save the program, or you'll crash into disk BASIC and lose everything.

Rounding Function

In many cases single-precision calculations result in numbers calculated to more places than you want. The FNSIG(X,N) function at the heart of Figure 2 allows a number x to be rounded to n significant digits.

It's always a good idea to have something moving or going on so that the user knows that the program hasn't crashed when it looks like it's just sitting there completely frozen.

The procedure is straightforward: You multiply the number by a power of ten, round it to an integer, then divide by the same power of ten. The trick is to find the correct power of ten and avoid problems with negative numbers and zero. FNSIG does this by subtracting the integer of the base 10 log of the number plus 1 from the number of significant digits wanted. Multiplying x by 10 to this power results in a number with n digits ahead of the decimal point.

The base 10 log (found by dividing the base e log by 2.302585) will blow up if x is negative or zero. FNSIG fixes this simply by using the absolute value of x . A zero value of x is no problem if a 1 is added when $x=0$. This is also done in the denominator to avoid a division by zero. The

Complete Accounting Software Including Payroll for \$15 per module

101 Profitable Reasons To Buy MCBS Accounting Software!

General Features

- 1) Menu Driven System
- 2) Integrated or Stand Alone
- 3) Simplified Installation
- 4) Complete Audit Trails
- 5) Data Files can be accessed by Lotus, dBase, etc.*
- 6) Manuals on diskettes, print them on your printer.
- 7) Modules can be purchased separately.
- 8) Accounts and transactions limited only by disk space.

General Ledger

- 9) Supports multiple departments
- 10) Flexible chart of accounts.
- 11) Prints financial statements in flexible, user defined formats.
- 12) Prints Income Statement and
- 17) Balance Sheet by current month, current quarter, and 3 previous quarters.
- 18) Prints Departmental Income
- 23) Statement and Balance Sheet by current month, current quarter, and 3 previous quarters.
- 24) Prints Budget Comparison
- 25) Income Statement and Balance Sheet comparing Actual vs. Budget with variances and ratios.
- 26) Prints Trial Balance and Chart
- 27) of Accounts
- 28) Prior Period Adjusting Entries do not impact current results.
- 29) Data Entry screen displays beginning, current and ending balances as well as the last 10 entries.
- 30) System allows new accounts to be created during data entry.

Accounts Payable

- 31) Provides for entry, updating and deletion of vendor information.
- 32) Allows entry, editing and posting
- 33) of payables, adjustments, cancellations and prepaids.
- 34) Prints the Open Item & Cash
- 35) Requirements reports.
- 36) Allows partial payments.
- 37) Prints A/P checks
- 38) Prints Check register.
- 39) Prints the A/P distributions to the General Ledger
- 40) Prints the vendor analysis report.
- 41) Interfaces to MCBS' General Ledger or may stand alone.

Accounts Receivable

- 42) Provides for entry, updating and deletion of customer information
- 43) Allows entry, editing and posting of receivables, credit memos, cash payments.
- 44) Allows up to 99 repetitive line items for fast invoicing.
- 45) Prints the open item and aged receivables reports.
- 46) Prints Invoices, Credit Memos
- 48) and Statements.
- 49) Prints Sales Analysis.
- 50) Supports Partial Payments
- 51) Prints Invoice, Payment and Credit Memo Registers.
- 52) Interfaces to MCBS' General Ledger or may stand alone.

Payroll

with State & Local Taxes

- 53) Provides for entry, updating and deletion of employee information.
- 54) Handles hourly, salaried or
- 56) commissioned employees on weekly, biweekly, semi-monthly or monthly pay periods.
- 57) Calculates Federal, State and Local Taxes.
- 58) Allows user to maintain all tax tables.
- 59) Maintains payroll history.
- 60) Calculates the payroll.
- 61) Prints the payroll register, check register and deductions register.
- 62) Prints payroll checks.
- 63) Provides for after-the-fact payroll
- 64- Provides W-2's, 1099's, and 941's
- 67) & prints quarterly earnings reports.

Inventory

with Order Entry & Purchase Orders

- 68) Uses for LIFO and Standard Cost.
- 69) Provides for inventory item entry, updating and deletion.
- 70) Provides for order entry and editing with inventory update during entry.
- 71) Stock and non-stock items.
- 72) Handles purchases, returns, shipments and adjustments.
- 73) Prints invoices, credit memos, picking tickets, purchase orders, price lists and shipping labels.
- 74) Prints on preprinted forms or plain paper.
- 75) Prints stock status report and purchasing advice report.
- 76) Full back order retention.
- 77) Quarterly, yearly and prior year inventory history.
- 78) Performs book to physical analysis.
- 79- Over 20 management reports
- 99) including extensive Sales Analysis and Lost Sales Report.
- 100- Interfaces to MCBS' General
- 101) Ledger, A/R, A/P or may stand alone.

**Any Module For \$15 ea.
Or All 5 For \$50 Total**

**TO ORDER CALL:
1-800-334-0854, Ext. 826
For More Information:
call (713) 444-6269**

(MCBS)

Micro Computer Business Services

12703 Stubner Airline Houston, TX 77014

Complete Package - G/L, A/P, A/R, P/R, INV	QTY. _____ X \$ 50.00 ea. = _____
Individual Module - G/L, A/P, A/R, P/R, INV	QTY. _____ X \$ 15.00 ea. = _____
Accountants' Client Write-up System	QTY. _____ X \$150.00 ea. = _____
Pay Method Prepaid, Check Enclosed _____	Texas Residents Add 6 1/4% = _____
MC, # _____	Shipping Charges = 5.00
VISA, # _____	If COD add \$5.00 = _____
Expires: _____ Signature _____	TOTAL= _____
Company Name: _____	Contact: _____
Street/Number: _____	Phone: _____
City: _____ State: _____	Zip: _____

Accountants ONLY ...

Accountant's Client Write-up System

- 1) Designed for Accountants
- 2) Allows multiple clients on same disk, accessed by client code.
- 3) Allows new accounts or new employees to be entered from data entry screen.
- 4) Supports multiple departments.
- 5) Running balance shown on screen during data entry.
- 6) Payroll entries made from same entry screen as other entries.
- 7) Accumulates all payroll information and prints Quarterly payroll reports including 941's
- 8) Prints W-2's and 1099's.
- 9) Produces client bill on a variety of bases.
- 10) Produces more than 12 reports including Changes in Financial Position, Income Statement, Balance Sheet, Detailed General Ledger.
- 11) Includes automatic report printing.

\$150

All programs run on IBM (PCjr/PC/XT/AT), AT&T, EPSON, TANDY (1000/1200/2000), TI, WANG, COMPAG, CORONA, SANYO, COLUMBIA*, and MS-DOS machines.

Requires 128K Ram, 2 Floppies or Fixed Disk, 80 Column Printer, MS-DOS, PC-DOS 2.0 or later.

*Computer & software names are trademark or registered by their respective manufacturers.

MONEY BACK GUARANTEE!

Service Contract
Telephone consultation - \$50/yr.
Shipping charges \$5.00
Texas Resident add 6 1/4% Tax
COD Charges \$5.00
Payment by Check, MC or VISA

ATTENTION DEALERS!!!! Call or Write Now for the VERY BEST MARGINS (over 50%) in the Industry.

USER-TO-USER

CINT function is not used to round off the number because it is limited to the range -32,768 to 32,767. Adding .5 and using INT gives the same result without CINT's limitation.

The FNSIG function works for any x, positive, negative, or zero. However the number of significant digits must be between 1 and 7.

Dennis A. Lundell
Uniontown, Ohio

This does avoid several pitfalls (such as

CINT's integer limitation) and is a good demonstration of a defined function with two arguments.

VDISK Front Panel

If you enjoy front-panel lights on computers and use the DOS 3.x VDISK.SYS RAM disk, the patch in Figure 3 will put a rotating action symbol in the upper left-hand corner of both mono and color screens whenever you access the RAM disk.

To install it, just get into DOS and type

the following:

```
COPY VDISK.SYS ADISK.SYS
```

Then use your word processor (or, if you happen to be a sensationally accurate and patient typist, the DOS COPY CON command) to create a file called PATCH.DO containing the DEBUG patch instructions in Figure 3. Then get into DOS once again and type the following:

```
DEBUG ADISK.SYS < PATCH.DO
```

As a last step, edit your CONFIG.SYS

```
100 ' Significant digit function -- by Dennis A Lundell
110 CLS
120 DEF FNSIG(X,N)=INT(.5+X*10^(N-1-INT(LOG(ABS(X)-(X=0))/2.302585)))/(10^(N-1-INT(LOG(ABS(X)-(X=0))/2.302585)))-(X=0))
130 INPUT "Enter number to be rounded: ",Y
140 INPUT "Enter number of significant digits: ",Z
150 PRINT FNSIG(Y,Z):GOTO 130
```

Figure 2: FNSIG rounding function, for any positive or negative number (or zero), that avoids CINT limitations.

\$6 Software

How could it be any good for only \$6? Many capable programmers have written high quality programs with complete documentation on disk and request a donation from satisfied users. Other program authors just want people to use the programs they have built and found useful. PC-SIG provides a single source of IBM-PC programs for \$6 per disk. Listed below are sets of some of the more popular disks from the library of over 350 disks.

- | | |
|--|---|
| <input type="checkbox"/> 350-page printed Directory \$6.85 | <input type="checkbox"/> Set of 3 Utility Disks \$18
(Disk cataloging program, file modify and restore utilities) |
| <input type="checkbox"/> Set of 5 Introductory Disks and Directory \$36
(Includes word processing, filing system, utilities, games, and printed directory) | <input type="checkbox"/> Set of 4 Top Game Disks \$24
(Arcade quality games, several on each disk) |
| <input type="checkbox"/> Set of 3 Financial Disks \$18
(Personal general ledger, spreadsheet, stock trading) | <input type="checkbox"/> Set of Two Genealogy Disks \$12 |
| <input type="checkbox"/> Set of 6 Lotus/Symphony Worksheet Disks \$36
(Templates, Tech notes, utilities, macro library) | <input type="checkbox"/> How to Unprotect Popular Software (2 disks) \$12 |
| <input type="checkbox"/> Set of 5 Language Disks \$30
(Assembler with tutorial, Logo, XLISP, Fortran) | <input type="checkbox"/> PC-SIG Directory on Disk (2 disk set) \$12 |
| <input type="checkbox"/> Set of 4 Educational Disks \$24
(Filing tutor, history, BASIC tutorial, math tutor) | <input type="checkbox"/> 1 year PC-SIG membership \$15
(Receive all PC-SIG publications including printed directory, newsletters, and disk discounts) |

Please add \$4 postage and handling to all disk orders, add \$1.50 postage and handling for the Directory only. California residents add state sales tax.

Total Enclosed ☐ by Check ☐ Visa ☐ MC
Card No. _____ Exp. date _____
Day phone _____ Signature _____
Name _____
Company _____
Address _____
City _____ State _____ Zip _____



PC-SIG 1030 E. Duane Ave., Suite J
Sunnyvale, CA 94088
(408) 730-9291

To order, call
800-235-6646
800-235-6647 (CA only)

CIRCLE 144 ON READER SERVICE CARD

Precision Data Products
Complete Line of Quality Supplies for Your Computer

TOLL FREE ORDER LINE
800-258-0028
FOR INFORMATION CALL
616-452-3457
C.O.D.

COMPLETE LINE OF 3M DATA RECORDING PRODUCTS

DISKETTES

\$30.00 in Rebate Offers Packed in Every Box.

5 1/4" SSDDRH.....	\$1.32 Each
5 1/4" DSDDRH.....	\$1.62 Each
5 1/4" SSDD 96TPI RH.....	\$1.95 Each
5 1/4" DSDD 96TPI RH.....	\$2.37 Each
5 1/4" DS HD 96TPI.....	\$3.15 Each
5 1/4" SS Micro Diskette.....	\$2.35 Each
5 1/4" DS Micro Diskette.....	\$2.99 Each

Sold 10/Box

ORDER NOW—LIMITED TIME OFFER
"APPLES TO APPLES"
We will BEAT any price on 3M Diskettes in this issue. [Guaranteed same day shipping of in-stock items on orders placed by 2:00 p.m. E.S.T.]
NEED IT FAST? Ask about 1-DAY AND 2-DAY DELIVERY SERVICE (available for a reasonable upcharge.)

MINIMUM ORDER \$25.00. Add 10% for quantities less than 50. Prices subject to change without notice.
Shipping and Handling \$4.00 per 100 diskettes. \$3.00 per 5 data cartridges. Reduced shipping charge for larger quantities.
C.O.D. add \$4.00. MI residents add 4% sales tax.

Precision Data Products
P.O. Box 8367, Grand Rapids, MI 49508
(616) 452-3457 • Michigan 1-800-452-3464
Outside Michigan 1-800-258-0028

3M

CIRCLE 123 ON READER SERVICE CARD

```

e 01d9
e9 f3 00
e 02cc
e9 a6 00 52
e 02d0
57 56 1e 0e 1f 8a 1e 00 02 43 80 e3 03 32 ff 88
e 02e0
1e 00 02 8a 87 01 02 b4 07 bb 9e 00 b9 00 b0 8e
e 02f0
d9 89 07 b9 00 b8 8e d9 89 07 1f e9 de fe
e 0300
00 7c 2f 2d 5c
w
q

```

Figure 3: PATCH.DO Script for patching DOS's VDISK.SYS to display a rotating character in the upper right-hand corner of your screen. To use this, first copy VDISK.SYS to ADISK.SYS. Use your word processor (or the DOS COPY CON command) to create a file called PATCH.DO with the contents below. Get into DOS and type DEBUG ADISK.SYS < PATCH.DO and then change references in your CONFIG.SYS file from VDISK.SYS to ADISK.SYS.

file to substitute ADISK.SYS for your old VDISK.SYS. (ADISK stands for Action...symbol Virtual Disk.)

Bjorn Benson
Walter Bright
Kirkland, Washington

If you love to see little flashing symbols in the corner of your screen, this is the program for you.

Share Your Discoveries

Tell the world about your latest discovery through User-to-User, and we'll pay you \$50 for your trouble, plus an extra \$25 if you submit it on a disk.

If you send a disk, please include a printout of your submission to ensure against damage in transit. Mail your contributions to: User-to-User, PC Magazine, One Park Avenue, New York, NY 10016.

XXX WAVE MATE BRINGS MUSCLE TO YOUR IBM PC/XT WITH IT'S 80286 MOTHERBOARD

BULLET-286 makes the XT perform with greater power and speed than the IBM PC/AT

It's the new BULLET-286 motherboard for the IBM PC/XT marketplace. This advanced-technology product utilizes the Intel microprocessor 80286 while maintaining both hardware and software compatibility with the IBM PC/XT. By simply replacing the existing XT board with our new BULLET-286, you get greater power and speed than the IBM PC-AT. Thus, existing PC/XT users can preserve their investment in hardware and software while moving a quantum leap beyond PC-AT performance.

The BULLET-286 contains a 6 megahertz no wait state 80286 microprocessor in place of the XT's 4.77 MHz 8088. There is an 80287 math co-processor option, 8 IBM expansion slots, and enhanced ROM BIOS. The BULLET-286 is equipped with 256K bytes of

memory, expandable to 1 megabyte on-board.

The BULLET-286 is compatible with the IBM PC/XT to a degree far beyond the IBM PC-AT product. Application programs and operating systems (PC-DOS, CP/M, UCSD Pascal, Pick, Oasis, Unix-derivatives) available for the XT, can run without incompatibilities on the BULLET-286.

You can order now. The BULLET-286 is available with 256K RAM, with options to 1 full megabyte. Prices start at \$1,995.

Quantity discounts available. OEM and dealer inquiries welcome.

WAVE MATE INC.

14009 S. Crenshaw Blvd.
Hawthorne, CA 90250
(213) 978-8600 Telex: 194369

WAVE MATE EUROPE

159 Chee de Veurgat
1050 Brussels, Belgium
Tel: (02) 649 1070 Telex 846 61828



CIRCLE 204 ON READER SERVICE CARD

CopyWrite

BACKS UP IBM PC SOFTWARE

Hundreds of the most popular copy-protected programs are copied readily. CopyWrite needs no complicated parameters. It needs an IBM Personal Computer, or an XT or an AT, 128k bytes of memory, and one diskette drive. CopyWrite will run faster with more memory or another drive.

CopyWrite is revised monthly to keep up with the latest in copy-protection. You may get a new edition at any time for a \$15 trade in fee.

CopyWrite makes back up copies to protect you against accidental loss of your software. It is not for producing copies for sale or trade, or for any other use that deprives the author of payment for his work.

To order CopyWrite, send a check for \$50 U.S., or call us with your credit card. We will ship the software within a day.



Quaid Software Limited

45 Charles Street East
Third Floor
Toronto, Ontario M4Y 1S2
(416) 961-8243

Ask about ZeroDisk to run copy-protected software from a hard disk without floppies.

EDITED BY CHARLES PETZOLD



PC Tutor

Do you have a technical question about your PC? PC Tutor answers both elementary and advanced inquiries.

DIF Difficulties

Q: PC Tutor in Volume 4, Number 12, suggested writing to the DIF Clearing House for more information about the DIF file format. We did so and found that it no longer exists. Is there another source for detailed information on DIF files?

Linda Ng
Lansdale, Pennsylvania

A: You might try looking for a book called *The DIF File* by Donald H. Beil. It's published by Reston Publishing Company, Inc. in Reston, Virginia. The book is paperback, costs under \$20, and has lots of examples. A 12-page bibliography lists sources for further information.

Color Me Anything

Q: I've been trying to change my background and foreground display colors at the DOS command level. I can do this in BASIC by using the COLOR statement, producing yellow text on a blue background with

```
10 COLOR 14,1,1
20 SYSTEM
```

But DOS reverts to the old ugly white on black when BASIC exits. I understand that ANSI.SYS may help, but how?

Rick Maningas
Chicago, Illinois

A: You're right that ANSI.SYS can help out, but the real trick here is to use the PROMPT command to write the ANSI control sequences that color the display.

To install ANSI.SYS, you'll need to have a file called CONFIG.SYS in the root directory of the disk you're booting from. This CONFIG.SYS file must contain the line

```
DEVICE=ANSI.SYS
```

DOS will then load ANSI.SYS every time you boot your machine.

I'm a "yellow on blue" fan myself, though I like a distinctive magenta DOS prompt that shows both the current drive and the current subdirectory. So, I use a prompt something like this

```
PROMPT $e [35;44;1mSp$gSe [33;44;1m
```

This looks like absolute gibberish on the printed page, but it won't on your display. You can actually make sense of it if you look at both the PROMPT command syntax and the ANSI control sequences. The initial \$e is PROMPT's lingo for the Escape code needed by ANSI.SYS, for instance. Figure 1 shows the numbers for ANSI.SYS screen attribute control sequences using the PROMPT command.

Set#;...;#m where # is shown below:

Normal white on black:	0
High intensity:	1
Monochrome display underline:	4
Blink:	5
Reverse video:	7
Invisible:	8

	Foreground	Background
Black:	30	40
Red:	31	41
Green:	32	42
Yellow:	33	43
Blue:	34	44
Magenta:	35	45
Cyan:	36	46
White:	37	47

Figure 1. The ANSI.SYS control sequence for setting screen attributes in the PROMPT command. A quick CLS (Clear Screen) after a program exit will color the whole background to blue. Put the PROMPT command in an AUTOEXEC.BAT file and you'll soon forget you ever had to live with the default white-on-black that DOS usually gives you.

PC TUTOR

1-2-3 Extremities

Q: Using Lotus's 1-2-3, how can I get self-adjusting ranges? Assuming I have a range full of numbers, I can use

{END} {RIGHT} {END} {DOWN}

in a macro to get to the extreme end. But if some of the fields contain blanks, this doesn't work right.

Steve Elkin
Montreal, Quebec

A: If I understand you correctly, you want something that will throw the cursor to a cell at the lower right-hand corner of the active region of the spreadsheet. This can be done with the {END} {HOME} combination. {END}{HOME} is very handy, particularly for defining a print range and always goes to the same cell regardless of the initial cursor position.

Off with Its Header

Q: I've been using a software package that creates print files with printer control characters embedded right at the beginning of the file. But I have no control over these characters, and they are not right for my particular printer. I've been using my editor to delete them, but for large (200K-300K) files it takes several minutes to load the file and several more minutes to save it back to disk. How can I get those characters out? We don't have any assembler programmers around here, so the answer has to be simple.

Larry C. Young
Tulsa, Oklahoma

A: Removing undesirable header information from a large file can be tricky. Most editors will not handle this well, but I find DEBUG to be handy for such situations.

Let me assume you have at least as much free memory as the size of your file plus about 16K for DEBUG itself. Your file is called FILE.PRN, and there are ten undesirable characters to remove at the beginning. Just load the file into DEBUG, put blanks in the first 10 bytes of the file (with the E or Enter command beginning at 100 hexadecimal, the address where DEBUG loads the file), write it back out (with W), and then quit DEBUG (with Q).

```
C>DEBUG FILE.PRN
```

```
-E 100 " "
-W
-Q
```

If you don't have enough memory to hold the file, you'll get an "Insufficient Memory" message, in which case you should not do the write or your file will be incomplete.

You could easily set this up as a one-line batch file using file redirection for DEBUG's commands. The one line of the batch file (FILEFIX.BAT) would look like this:

```
DEBUG %1 <FILEFIX.TXT
```

Before using FILEFIX.BAT, you would first create (with EDLIN or your favorite word processor) the FILEFIX.TXT file, containing the commands DEBUG will use. These would be

```
E 100 " "
W
Q
```

You would run it simply by entering

```
FILEFIX filename
```

As an alternative to using DEBUG, you might also check out the Norton Utilities, which contain programs that can help you make small file changes (such as eliminating the first few bytes of a file) very quickly.

Still another way to accomplish your goal is to use a program to substitute blanks for the control characters that are now at the head of your file. The BASIC listing shown in Figure 2 would be suitable. It reads in just the first, say, 10 bytes of the file, substitutes blanks for the control characters, and then writes it out. This method avoids having the program process the whole file and therefore should be very fast.

```
10 INPUT "Enter Filename";FILENAME$
20 INPUT "Number of characters to blank";CHUNK$
30 OPEN "R",#1,FILENAME$,CHUNK$
40 FIELD #1,CHUNK$ AS REC$
50 LET REC$ = STRING$(CHUNK$, " ")
60 PUT #1,1 : CLOSE #1 : END
```

Figure 2. A BASIC program to replace undesirable file header information with blanks. The use of random I/O avoids having the program process the entire file.

DROWNING IN THE SEA OF INFORMATION?



Somewhere in The Sea of Information

At last! they gasped. Software for the accessible library! And for only \$79.50! they noted incredulously.

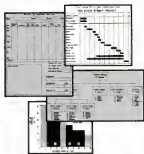
Quick Rixanne, a check to order by mail! he beseeched.

I've lost my checkbook Herschel, but I have Visa and MasterCard!

Oh joy! Never again will we drown in the Sea of Information with BIBLOG2. We will catalog and quickly retrieve information from all our magazines, books, and journals! they joyfully cried then passionately embraced.

MICRO-DYNAMICS OF TEXAS
P.O. Box 40691
Houston, Texas 77240
Outside Texas: 1-800-892-9957
In Texas: 713/896-9957

NOW YOU CAN DO ALL THIS WITH OR WITHOUT A GRAPHICS BOARD...



INTRODUCING MONOGRFX™ ONLY \$69.95

- Makes it easy and inexpensive to create organizational diagrams, Gantt charts, everyday business forms and other free-form line and block drawings on your IBM PC.
 - Integrates graphics and text—including ASCII files created with other popular programs.
 - Lets you use three different character sizes (in normal or condensed print) on sheets as large as 11" x 14".
 - Supports over 50 popular printers, plus most monochrome and color/graphics display adapters.
- In short, MonoGrafx provides the features you need to create impressive reports, presentations, proposals, handouts—even on-screen slide shows!

TRY IT RISK-FREE!

Send \$69.95 plus \$3 shipping (\$10 outside U.S. and Canada) to: Analytics International, Inc., 1365 Massachusetts Avenue, Arlington, MA 02174. (Mass. residents, add \$3.50 tax.)

MasterCard and VISA orders **CALL TOLL-FREE 1-800-992-0085**. (In Massachusetts, dial 617-641-0400.)

We'll rush you your MonoGrafx software package right away. If you're not completely satisfied, just return it within 15 days of delivery for a full, unquestioned refund or credit. Our guarantee is that pure and simple.

- ☐ **YES**, please rush me MonoGrafx to try risk-free for 15 days. My check, money order or company P.O. is enclosed.
- ☐ Send me more free information about your software for busy people.

Name _____
Title _____
Company _____
Address _____
City _____
State _____ ZIP _____
Phone _____ Ext. _____

IBM PC is a registered trademark of International Business Machines Corporation. MonoGrafx is also available on IBM AS/400. © 1985 Analytics International, Inc.

Analytics International, Inc.
1365 Massachusetts Avenue
Arlington, MA 02174

PC TUTOR

Making Programs Resident

Q: I was delighted with Steve Holzner's MOVE.COM program in the Volume 4, Number 6, Programming column. I need this program so often that I'm copying it to every diskette I use. Is there any way instead to make MOVE.COM resident in memory so it will be available whenever I need it? Could some of the smaller DOS programs, such as MODE or EDLIN, also be made resident in memory so they could be loaded once from my DOS disk and I wouldn't need them on my other disks? I realize that using a RAMdisk program would give the same results, but I'm looking for a simpler method.

J.T. Merrill
San Francisco, California

A: Using a RAMdisk is definitely the simplest solution for your problem. But let's take a look at some of the issues.

When a normal program is run, COMMAND.COM loads it from the disk into memory and gives it control. When the program terminates, COMMAND.COM again takes over and can use the memory occupied by the program for the next program it loads.

Some programs, however, are specially designed to remain resident in memory. The DOS 2.0 programs ASSIGN, GRAPHICS, MODE, and PRINT all can remain resident in memory. When these programs terminate, COMMAND.COM does not free all the memory they occupied, so they may continue to work while other programs are executing. Thus, for example, part of MODE.COM can remain resident to redirect parallel printer output to the serial port. MODE handles all the translation (including status return codes) so the calling program is none the wiser.

Other programs that remain resident in memory are designed to do something when a certain key combination is pressed. For instance, John Dickinson's DOORS program (PC Magazine, Volume 4 Number 3) is a resident program that switches between the monochrome and color/graphics display using the Alt-Shift key combination.

Unfortunately, however, a program not designed to remain resident in memory cannot easily be adapted to do so. Even under a multitasking system such as IBM's

TopView, a program like MOVE.COM would have to be reloaded from disk every time it is run because certain variables would have to be reinitialized.

I don't think this is what you want to do with the MOVE or EDLIN programs. You just want to have the program available at the DOS command level, but you don't want the program taking up room on your application diskettes. This is obviously a job for a RAMdisk.

A RAMdisk (or "virtual disk") program sets aside part of your memory to use as a make-believe disk drive. To most other programs, this "disk" acts exactly the same as your real disk drives, except that it's much faster. The contents of a RAMdisk are destroyed when the PC is turned off or rebooted, however, so you have to be careful if you are using one to store data.

The DOS 3.0 and 3.1 VDISK program is very flexible, allowing you to make the RAMdisk practically any size you want. If you only want to store a few files on it and they take up less than 16K total, you can install a 16K RAMdisk with 128-byte sectors and four directory entries with the following line in a CONFIG.SYS file on your boot disk:

```
DEVICE=VDISK.SYS 16 128 4
```

(See the "Configuring Your System" chapter in the PC-DOS manual for more information on VDISK parameters.)

On a two-diskette system, the RAMdisk will drive C:. Your AUTOEXEC.BAT file would include statements to copy files to the RAM disk, such as

```
COPY MOVE.COM C:
COPY EDLIN.COM C:
```

If your AUTOEXEC.BAT file also includes the command

```
PATH C:\
```

then you can just run the commands without even having to specify the RAMdisk drive letter. For your needs, I don't think you can get any simpler than this.

The PC Tutor solves practical problems and explains points of general interest. To see your questions answered here, drop a line to PC Tutor, PC Magazine, One Park Avenue, New York, NY 10016. ■



Reviews in Brief

Those Golden Oldies Are Back

BY JAMES LANGDELL

Where were you in 1975 when these words first came onto your screen: "You are standing at the end of a road before a small brick building."



PONG, one of four classic computer games included in Golden Oldies Volume 1.

Yes, that's the start of *Adventure*—the first interactive fiction program—created 10 years ago by Will Crowther and Don Woods. Now you can relive this classic moment of imaginative programming by spinning a disk entitled *Golden Oldies Volume 1*. Even though this first *Adventure* can only respond to commands of one or two words (such as "west" or "catch bird"), there's a lot of good playing left in the game.

And who could forget *Eliza*? *Golden Oldies* has Joseph Weizenbaum's psychiatrist-on-a-disk ready to say "Tell me more about your problem"—just as she did back in 1964.

The paddles of *Pong* are ready to strike back with the same punch they had in 1972—the year Al Alcorn installed Atari's first videogame in a

Sunnyvale tavern, and it became an overnight sensation. The original *Pong* has been well simulated in this re-creation for the IBM PC. Software Country also provides a snazzier version of *Pong* that gives you control

over the speed of play, the color of the ball, and the playing field.

And that's not all! *Life* lives again, as never before. In this more cerebral entertainment, you create colonies of pixel patterns that grow, breed, consume each other, and die. The rules of *Life* were invented in 1970 by British mathematician John Conway. The *Life* program in *Golden Oldies* was rendered in IBM PC assembly language by Bill Gosper, an early explorer of *Life* who created the "glider gun"—a vigorous pattern with a long lifespan.

Versions of these four games can be found in many public-domain software libraries, but those have been tinkered with by a variety of hands throughout the years. This disk returns to the source. By buying Software

Country's collection, you'll not only see the programs as their creators intended, but will be paying royalties to the creators (or their licensees)—something they've rarely received in the history of their programs.

All four games have been framed well by Software Country's programmers, who provided clear menu screens and consistent commands. Each game runs well on either color or monochrome systems. The programs are compiled to run fast, and the disk is copy protected.

The manual for *Golden Oldies* pays respect to the historical significance of these programs, reprinting chapters about them from popular books like *Hack-*

ers, *Digital Deli*, and *The Soul of a New Machine*. But the best tribute to the creators of *Life*, *Adventure*, *Eliza*, and *Pong* is to discover that their games are still worth playing. That's why they're software classics, not just footnotes in the history of computing. ■

Computer Software Classics:

Golden Oldies Volume I
Software Country
270 North Canon Dr., #1297
Beverly Hills, CA 90210
(213) 278-8450
List Price: \$29.95

Circle 864 on Reader Service Card

Go with dFlow

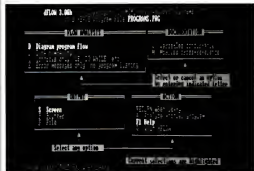
BY DAVID OBREGÓN

SYNTAX ERROR

In *dBASE* programming, the above message—or any of *dBASE*'s 54 built-in error messages—often means infuriating hours of writing and re-writing lines of command code to get things working right. Despite the convenience afforded

by *dBASE*'s SET STEP ON and SET ECHO ON commands, even finding the error, buried somewhere within unnumbered lines of code, can be a frustrating experience.

dFLOW is the first low-cost utility designed specifically to comb *dBASE* code for errors. Despite several shortcomings in the version I reviewed, *dFLOW*



dFLOW's main menu screen shows all available program functions and options.

is the kind of tool you quickly find you can't live without if you write a lot of dBASE code regularly.

The utility's main screen is a four-box menu showing all available functions and options. dFLOW's mnemonic command structure is simple enough that a quick read of the first five or so pages of the accompanying paperback manual suffices to get you started. The screen changes to a scrolled view of your command file, with all code indented to generally accepted program documentation tab settings—even if your original program was written in quick-and-dirty style (a.k.a. flush left). This indented version can be copied back to disk under a new name—a feature that helps you clean up unreadable programs and is a real boon to those who may someday have to figure out how your programs work. Any errors that the utility finds in your code are highlighted on the screen next to the troublesome line and are listed again at the end of the session.

A program cross-reference option graphically illustrates relationships among the program modules that comprise the complete application system. In this mode, each component program of an application appears as a labeled box, from which flowchart lines lead to subprograms called from the main program. An ASCII print option al-

lows you to create hard-copy images of these flowcharts—a nice touch to any documentation you might have for your application. Wallsoft Systems has also included another nice documentation function—a listing of all of the memory variables created within your application, which is useful for locating possible conflicts.

This latter feature is especially important because dFLOW does not check such things as conditional statements for validity beyond correct syntax, or the existence of memory variables before they are called for by a statement. Still, dFLOW is an exceptional tool for dBASE programming. Its functions for documenting programs are excellent, permitting the development of a clear, easy-to-follow user's manual for your application. Also, having neat print-outs of your quick-and-dirty programs can often be enough to help you avoid those hated dBASE error messages. ■

dFLOW, Version 3.05
Wallsoft Systems, Inc.
233 Broadway, #869
New York, NY 10279
(212) 406-7026
(800) 23-DFLOW
List Price: \$129
Requires: 128K RAM, one disk drive, PC-DOS, dBASE.

Circle 683 on Reader Service Card

Hebrew/English W.P.

BY CHERYL J.
GOLDBERG

The Hebrew/English version of WordMill is a full-featured word processor that allows you to write text in both languages. You can switch between Hebrew and English in the same document, even in the same sentence, by pressing Ctrl-Tab. Depending on which language you choose to write in primarily, the Hebrew words (you can't type vowels) are either pushed

toward the right of the page as you type or pulled toward the left, ending up in the correct right-to-left direction. The menu and documentation come in both languages. The program also features a Greek and mathematical character set, with the ability to produce sub- and superscripts for complex scientific and mathematical equations.

To set up WordMill, you must install two chips, one in the monochrome/color graphics card and the other in the printer,

בראשית ברא אלקים את השמים ואת הארץ.
In the beginning God created the heaven
and the earth.
והארץ היתה תהו ובהו וחשך על פני תהום
ורוח אלקים מרחפת על פני המים.
Now the earth was unformed and void, and
darkness was upon the face of the deep;
and the spirit of God hovered over the
face of the waters.
ויאמר אלקים יהי אור ויהי אור.
And God said: "Let there be light." And
there was light.

WordMill permits mixed use of English and Hebrew text within a single document.

allowing the program to display Hebrew characters on the screen and print Hebrew text. WordMill supports 50 printers and provides a Hebrew/English daisy wheel for letter quality printers. For setting up the keyboard, WordMill provides an adhesive strip of Hebrew letters that you must cut apart and stick to your keyboard.

WordMill sports most common word processing capabilities like text merging, formatting and reformatting text, producing automatic headers, footers, page numbers, leaders, bold face, and italics. You can search for an English word and replace it with a Hebrew one, and vice versa. Pagination commands allow you to further specify everything from type size to your choice of three fonts for each language.

WordMill comes with a variable-length phrase dictionary—between 1,500 and 9,999 bytes. You can use this dictionary to create a list of phrases, then give each phrase a two-letter abbreviation and call it into a document at any time. Unfortunately, WordMill does not come with a Hebrew/English dictionary.

Although the accompanying documentation is excellent and tells you exactly how to use every feature, the program can be cumbersome, requiring you to remember strings of WordStar-like function key, Ctrl-, or Alt-plus-letter commands. For example, widening the columns in an existing document is a six-step operation during which you must often flip through the manual to determine how to perform each of the six margin-widening steps. In situations like these, it would be useful if the program provided help screens, but it

doesn't.

Also, while the pagination process allows you to precisely design a document, it can be annoying to go through 22 formatting steps, not to mention switching between three modes of operation—edit, pagination, and directory—in order to print a document. Finally, the program should have an automatic insert, rather than requiring you

WordMill provides a Hebrew/English daisy wheel.

to press the Ins key before each addition. In a program that costs \$875, such annoyances and omissions become serious flaws.

Despite its imperfections (and because it's so machine-specific), WordMill's major claim to fame may well be that its Hebrew/English version—as well as versions in all the Romance languages plus Greek and Aramaic—is making the use of the IBM PC catholic as it converts users throughout the world. ■

WordMill, Version 3.1
Hebrew/English Word
Processor
OmniGal Systems
4170 Wallis Court
Palo Alto, CA 94306
(415) 493-0463
List Price: \$875; backup
diskette, \$39.95; multilingual
version, \$495.
Requires: 192K RAM, one
disk drive, PC DOS 2.0.

Circle 682 on Reader Service Card

THE SHORT REPORT by PHIL WISWELL

Prime Programs for Personal Business

Personal Lawyer Series

Drafting a simple legal document is something many people would like to do for themselves, if only they knew how. A lack of expertise prompts most of us to consult an attorney, though this action will likely change as "expert" legal software develops. One of the first such products for home use is a set of four programs called the *Personal Lawyer* series (Lassen Software, Inc., P.O. Box 1190, Chico, CA 95926; \$249.95; for PC, XT, and compatibles; requires 128K RAM, DOS 1.1 or higher). Each of the four programs is also available separately for \$79.95.

The first package, *Personal Lawyer/Wills*, was designed by a practicing attorney to help you generate a simple and legal will. To be honest, the program is easier to understand than most attorneys, and its presentation is always straightforward. You are engaged in a question-and-answer session, with your answers determining which other questions should be asked. Then the program searches its database for the appropriate paragraphs, and inserts names, dates, places, and other specifics within them. The resulting will, valid in all states but Louisiana, can be stored on disk or printed.

Wills is no better or worse than a book on how to write your own will, except that the program will print the document for you. And if you print the document to a disk file, it can be called up and edited by any word processor. If your estate is so vast and complicated that you wonder whether this program will do the trick, you should probably see a lawyer. I suppose the best testimony I can give is this: I used it to generate my "last will and testament," and I am very pleased with the result.

Second in the series is *Personal Lawyer/Power of Attor-*

23. Do you have any special gifts that you wish to leave to a specific person even though your spouse survives you?
(This series of questions allows you to leave special gifts to someone or some place even if your spouse survives you. Following these questions, you will be given an opportunity to leave special gifts (first to your spouse and then to another person if your spouse doesn't survive you.)

FOURTH:
I give my IBM PC/XT computer to my spouse should he or she survive me by thirty (30) days, and if not said gift shall Virginia G. Wiswell, should he or she survive me by thirty (30) days.

FIFTH:
I give the residue of my estate as follows:
1. If my spouse survives me by thirty (30) days, I give

Personal Lawyer/Wills generates simple, legal wills (backgrounds) from information that you have entered following the plain-English on-screen questions (inset). The resulting will is valid in all states except Louisiana.

ney & Statement of Guardianship, which is actually four different programs for generating legal documents that grant a general and special power of attorney, revoke a power of attorney, and grant a statement of guardianship. As with all programs in the series, this module begins with a question-and-answer session and ends with a printed legal document.

The next part of the series is *Personal Lawyer/Premissary Notes*, an extremely useful program for defining the conditions and terms of a loan. The notes generated by the program can be repaid with or without installments, interest, security, or balloon payments, or simply payable on demand. You enter both general and specific information about the loan through a question-and-answer session, and output can be directed to disk or printer. *Premissary Notes* does its job well, but anyone who would lend me money wouldn't need a note—except, of course, the bank, and it supplies its own.

The fourth program, *Personal Lawyer/Residential Real Estate Lease*, will likely be very popular among part-time landlords who want to be able to generate their own leases. Standard clauses cover the basic terms (length of lease, rent, and deposit) as well as specifics such as types of pets allowed,

how repairs will be handled, subletting, and so forth. Special clauses not included in the program can be added to the document with a word processor.

Residential Real Estate Lease will produce a legally enforceable document for a one or two-family house, apartment, or duplex. However, it is not meant to be used for commercial leases because of the number of different clauses that would be required. If you've ever rented your property, you know that the lease is invaluable. You also know what it costs to have your attorney prepare one.

MORGJ2

I've been trying to figure out what clever saying the title of this program stands for, but, alas, all I can deduce is that it is a strange spelling of "Mortgage2." In fact, *MORGJ2* is an easy-to-use, menu-driven financial tool that not only calculates mortgage payments and prints schedules for repayment of loans, but compares two mortgages or two payment options. For example, you can easily compare monthly versus bi-weekly amortization.

MORGJ2 eliminates the need for payment-factor books by generating 14 kinds of amortization and payment-factor tables, ranging from monthly to weekly, prepaid or budgeted,

American or Canadian, with annual, semi-annual, biweekly, or weekly compounding. If you know how you want to finance your mortgage, it shouldn't take longer than a few minutes to calculate it and print the tables. But the real power of the program is how quickly and easily its menu system helps you experiment with your options and evaluate different mortgages by comparing them in every important way. If only my banker were as helpful as *MORGJ2* (Different Products, Ltd., 1007 Earl Crescent, Burlington, Ontario, Canada, L7T 3R1; \$95 plus \$2 postage and handling; for PC, XT, and compatibles; requires 128K RAM, DOS 1.1 or higher).

8-to-5 Personal Computer Calendar

No matter what type of business you're in, the paper calendar is your most important organizational tool. Or is it? The *8-to-5 Personal Computer Calendar* offers features you just can't get with a wall or desk calendar. First of all, it isn't just one calendar—it's five. You can choose to display your information in daily, weekly, monthly, condensed monthly, or yearly calendar formats, either on the screen or printer. The calendar comes set up for a 12-month format.

You can easily edit information and move around the various calendar formats from the keyboard, with one exception: The screen "eats" your cursor, making it difficult to enter information. The extended functions that you really want from a computerized calendar, such as searching for appointment openings by variable criteria, just aren't there. However, you won't find a less expensive computer calendar, and now you know why. *8-to-5 Personal Computer Calendar* (Philips Software Company, P.O. Box 24651, Tempe, AZ 85282; \$23; for PC, XT, and compatibles; requires 128K RAM, DOS 2.0 or higher).

Doing Business Since 1980

A Division of CW Marketing, Inc.

SOFTWARE ADVISOR'S

telascot

Address: 2022 East Indian School Road
Phoenix, Arizona 85016

- Order Line Hours: Mon-Fri, 9:30-5:30 Saturday 9:00-1:00
- Order Processing: 800-321-9345
- 10:00 a.m. - 3:00 p.m. Monday - Friday
- Due to Copyright Laws No Returns on Software Purchases. Call for Defectives for a Return Authorization Number
- Add 2% for C.O.D. Orders
- Call us Purchase Orders

• No Charge for VISA and Mastercard

- Free Air applies ONLY to orders up to 10 lbs
- Shipping and Handling Add \$6.00
- Personal and Company Checks Will Delay Shipping 2 weeks
- Prices & Availability Subject to Change Without Notice
- We Do Not Guarantee Machine Compatibility

FREE*
AIR EXPRESS SHIPPING
You Pay the Ground
We Pay the Air

Gem Desktop \$ 29
Gem Draw \$ 85

Word Perfect (Ver. 4.0) . \$209
Supercalc 3 (Ver.2) ... \$159

SOFTWARE

WORD PROCESSORS

Leading Edge Word Processor	\$ 55
Leading Edge W/P with Spell & Mail	129
Microsoft Word 2.0	325
Microsoft Basic Word	159
Microsoft Serial Mouse	129
Microsoft 3.0	319
MS Word	159
PFS: Write	79
Volunteer Deluxe	145
Wordstar 4.0	159
Wordstar Pro Pack	329

UTILITIES

1 Disk	\$ 49
Copy & PC	29
Desk Organizer	55
Norton Utilities 3.0	49
Norton Utilities	49
Printout	36
Printer 4.0	73
Siskind	29
Sidekick (Unprotected)	49
Subways	33
Superlight	45
Superkey	36

PROJECT MANAGEMENT

Harvard Project Manager	\$149
Harvard 6.0 Project Manager	245
Microsoft Project	149
Super Project	199
Timeline 3.0	255

LANGUAGES

Basic Compiler (Microsoft)	\$229
Basic Interpreter (Microsoft)	209
C Compiler (Microsoft)	229
Cohol Compiler (Microsoft)	419
Concurrent PC DOS	99
Fortran Compiler (Microsoft)	299
Lattice C Compiler	299
Macro Assembler	89
Run C Interpreter	89
Visual C Compiler	173
Turbo Pascal 3.0	36
Turbo Pascal w/8087 3.0	95
Turbo Tool Box	29

ACCOUNTING

Accounting Partner	\$209
Accounting Partner 9	513
SP: GL A.R. A.P. Payroll	328 ea.
In House Accountant	159
One Wine Plus	159
Open Systems - GL A.R. A.P. Payroll	399 ea.
Payroll - GL A.R. A.P. Payroll	328 ea.
Real World - GL A.R. A.P. Payroll	299 ea.
Sorcom IUS - GL A.R. A.P.	228 ea.
State of the Art - GL A.R. A.P. Payroll	328 ea.

COMMUNICATIONS

CompuShare Starter Kit	\$ 16
CrossTalk 1X1	95
PTS Access	79
Remote	99

GRAPHICS

Chartmaster	\$229
Diagram Master	185
Dr Halo	99
Energygraphs	195
Energygraphs w/Printer Option	229
Microsoft Chart	149
PC Draw	305
PC Draw Light Plus	110
PC Paint w/Mouse	124
PC Stroke w/Handbook	115
PC Paintbrush	79
PFS: Graph	79
PrintMaster	33
Signature	145
Turbo Graphics Tool Box	30

TRAINING

Flight Simulator	\$ 32
MasterType	99
Mind Prober	29
Turbo Tutor	29
Typing Instructor	15
Typing Tutor II	30

INTEGRATIVE SOFTWARE

Ability	\$279
Well-Ed	185
Ensuite	329
Framework	Call
Smart Software Register	459
Symphony	Call

SPREADSHEETS

Lotus 1-2-3	Call
Multiplan	\$115
PFS: Plan	79
Spreadsheet Auditor 2.0	85

DATA BASE MANAGEMENT

Clust 3	\$119
Concordance	209
dBase III	Call
dBase III	Call
Extended Report Writer	89
Knowledgebase	249
Nutshell	Call
PFS: File	79
PFS: Report	71
Powerbase New Ver. Req. 2000	129
Quickbase	129
QuickReport	245
Think Tank	99

MONEY MANAGEMENT

Colliers & Sense w/Forecast	\$ 95
Home Accountant Plus	79
Tobias Managing Your Money	95

DISKETTES

Excel MD-2 (Qty. 100)	\$159
Excel MD-2 (Qty. 100)	159

HARDWARE

PRINTERS

Analog Printers	Call
Brother Printers	Call
Canon Laser Printer	\$2599
Canon Printers	Call
Citizen Printers	Call
Data Security Printers	Call
Digital D-25	549
Digital 630 ECI/IBM	1999
Epson Printers	Call
Juki 5000	199
Juki 5100	255
Juki 5200	599
NEC 2850	519
NEC 3050	599
NEC 3850	579
Okidata Printers	Call
Panasonic Printers	Call
Silver Reed Printers	Call
Star Monitors SG-15	219
Star Monitors Other Models	Call
Texas Instruments Printers	Call
Toshiba 1340	329
Toshiba 151	1029

MODEMS

Analog Modems	Call
Hayes Smartmodem 300	\$ 129
Hayes Smartmodem 1200	379
Hayes Smartmodem 1200B	319
Hayes Smartmodem 2400	379
Modem Smartcard Plus	279
Prometheus 1200B	309
US Robotics Research 1200	185
US Robotics Courier 3000	399

SCANS

A15 Six Pack	\$ 219
A15 Advantage	399
Hercules Color Card	145
Hercules Graphics Card	289
Paradise Model Graphics Card	359
Paradise 3 Pack	154
QuadLink	329
Tecmar Graphics Master	449
Tecmar Captain (No Memory)	159

KEYBOARDS

Keyboards 5151	\$199
----------------	-------

COMPUTERS

Sanyo	Call
Zenith	Call

DISK DRIVES

Alpha Omega Turbo Disk Drives	Call
Bertrouff Box	Call

MONITORS

Amdek Monitor	Call
Princeton Graphics HG-12	\$ 449
Tecmar Monitors	Call
Zenith Monitors	Call

PLOTTERS

Enter Sweet-P	\$ 759
Epson H-60	339

Canon
«PC» PERSONAL COPIERS

Canon PC-10 \$ 209
Canon PC-15 Call
Canon PC-20 719
Canon PC-25 929

Wordstar 2000 \$239
Wordstar 2000 Plus ... \$289

Masterpiece \$ 89
R:Base 5000 \$339

New on the Market

Flash Code

The Software Bottling Co. of New York is offering a program and screen generator for dBASE II or III capable of creating code for pop-up menus, multicolor screens, and more.

The *Flash Code* user draws a program's data entry and function menu screens directly onto a disk. All database file and field parameters are automatically specified during the screen design process and can be modified as needed by the designer. After this process, the software automatically generates error-free dBASE code for data files used by the screens.

List Price: \$150

Requires: 256K RAM, two disk drives, PC-DOS, dBASE II or III.

The Software Bottling Co. of New York
6600 Long Island Expwy., #308
Massapequa, NY 11378
(718) 458-3700

Circle 693 on Reader Service Card

Dave Winfield's BATTER UP!

With Avant-Garde Publishing's three-part training tool, you can now get advice directly from none other than New York Yankee's batter Dave Winfield on improving your batting style.

The complete package includes Dave Winfield's *BATTER UP!*, a software tutorial; *BATTER UP! The Act of Hitting*, Dave Winfield's book on the subject; and *SLUGFEST!*,



Dave Winfield's *BATTER UP!*, Avant-Garde Publishing Corp.

a computerized baseball game.

The software tutorial offers advice on pitches, batting stances, swing heights, grips, and hitting strategies. Animated figures demonstrate the different techniques from a variety of angles and at different speeds. The included book, *The Act of Hitting*, covers these techniques in greater depth and features Dave Winfield's helpful comments.

In *SLUGFEST!*, you choose a starting pitcher, league, and ballpark, and manipulate a batter using the techniques in the tutorial. The program automatically substitutes pitchers, keeps score, and computes batting averages.

List Price: \$39.95

Requires: 128K RAM, one disk drive, PC-DOS.

Avant-Garde Publishing Corp.
37 Commercial Blvd.
Novato, CA 94947
(415) 883-8083

Circle 692 on Reader Service Card

VTERM/4010

Coefficient Systems Corp. has produced a new version of its VTERM communications software that combines Tektronix terminal emulation, VT100 terminal emulation, four error-correcting protocols, and general communications capabilities. The features of VTERM/4010 include:

- Tektronix 4010 emulation—This component allows all host software written for the Tektronix 4010 terminal to be run on an IBM PC, including TELL-A-GRAPH, SASGRAPH, and PLOT-10. This feature also provides full printer and plotter support, transfer speeds up to 9,600 bits per second, support for the Microsoft Mouse, automatic dialing, programmable



VTERM/4010, Coefficient Systems Corp.

New on the Market Submissions Guide

All submissions to *PC Magazine's* New on the Market should follow these guidelines:

1. Include the retail price and details of both hardware and software needed for an end-user to properly use your new product. This includes required amount of RAM, number and type of drives, operating systems supported, and peripheral equipment needed.
2. Releases should be typewritten double-spaced on one side of the paper. Copies of advertisements may be included, but in most instances we need more information than is typically included in an ad. Include telephone contacts for marketing and technical questions.
3. If available, include black & white glossy photos of the product, 4 x 5 in. or larger.

New on the Market does not review products; do not send sample or demo copies of software. All product announcements are run on a space-available basis, at the exclusive discretion of the editor. Please note that it is impossible to guarantee publication of a product announcement for any particular issue.

softkeys, and more.

- **Selectable protocols**—The software's file transfer functions offer the user a choice of four error-correcting protocols, including the Kermit micro-to-mainframe standard. Kermit supports wildcard transfers, server commands, data compression, command macros, and other features. Other available protocols include Xmodem and protocol-free ASCII data transfers.

- **Full-screen scrolling**—VTERM/4010 emulates 132-column displays through horizontal scrolling and can implement a true 132-column display with an optional video adapter board. The program can also redisplay data that has scrolled vertically off the screen.

Other features of VTERM/4010 include a single-key toggle between the program and PC-DOS that lets the user run local applications without losing the terminal screen, and the VTRANS operating system, which includes host software for a variety of mainframe operating systems.

List Price: \$249

Requires: 192K RAM, one disk drive, PC-DOS 2.x, async board, graphics adapter.

Coefficient Systems Corp.

611 Broadway
New York, NY 10012
(212) 777-6707

Circle 691 on Reader Service Card

Digi-Data Magnetic Tape Subsystem

PC users wanting to add 1/2-inch, 9-track tape capabilities to their systems will find Digi-Data's Model 1000 controller an essential link. The controller accepts 7- or 8-bit data at asynchronous transfer rates from 110 to 19.2K bits per second. It is housed in its own desktop enclosure with power supply and connects directly to any RS-232 serial communications port.

A complete Digi-Data subsystem also includes the Model 2010 9-track tape transport, which will accept any industry-standard 1/2-inch, 1,600 bits-per-inch tape on reels up to 10 1/2 inches in diameter. Data tapes produced by the drive are interchangeable with those produced on any ANSI/IBM-compatible PE transport.

List Price: \$4,850

Requires: RS-232 port.

Digi-Data Corp.

8580 Dorsey Run Rd.
Jassup, MD 20794
(301) 498-0200
TWX: 710-867-9254

Circle 690 on Reader Service Card

ANSCO 2400 BPS Modems

ANSCO has released two modems, the Mod 5 and Mod 6, capable of data transfers at speeds up to 2,400 bits per second. Both modems include such features as automatic bps rate detection, manual or auto-



Digi-Data Magnetic Tape Subsystem, Digi-Data Corp.

swer capabilities, front-panel status and diagnostics displays, and a 1,200-bps operation mode.

In addition, the Mod 6 unit has an auto-dial function with memory capacity for 20 phone numbers. Individual phone numbers and log-on messages can be locked from further editing or display after initial entry and can be masked from the display during use.

List Price: Mod 5, \$795;

Mod 6, \$895

American National Supply Corp.

1243 W. 134th St.
Gardena, CA 90247
(800) 421-1270
(800) 821-3308 in Calif.
(213) 532-7780

Circle 689 on Reader Service Card

LSTRIEVE

Single users and users of eight major local area network systems can manage lists of up to 3 million names with this mailing list manager from Michalus Systems.

LSTRIEVE can maintain up to eight balanced B+ tree indexes for each of up to 99 different lists. The B+ tree method allows rapid data retrieval, as well as such unusual features as backwards searches by key, or conditional field changes for a range of key values. Users can define up to 99 different output formats for printing names up to 10 across.

The program can import data from WordStar, WordPerfect, and ASCII files. The multiuser

version is compatible with such LAN systems as Ethershare, Netware, Multilink, PCnet, Omnet, Plan, IBM, and Net One.

List Price: Single user version, \$275; multiuser version, \$595

Requires: 192K RAM, two disk drives, PC-DOS.

Michalus Systems

250 Burtis Ave.
Rockville Centre, NY 11570

Circle 688 on Reader Service Card

AST-FourPort/XN Adapter

PC AT users running the XENIX operating system can now support up to four devices or additional users with this plug-in board from AST Research.

Each AST-FourPort/XN includes XENIX device-driving and diagnostics firmware and four RS-232 serial ports. Up to two of the boards can be used within one PC AT with the same support software to overcome the AT's hardware limit of three ports or linked users.

List Price: \$495

AST Research, Inc.

2121 Alton Ave.
Irvine, CA 92714
(714) 863-1333

Circle 687 on Reader Service Card

Bulletin Board Software

ProtoSoft of Seattle has released four inexpensive programs that simplify the establishment of an on-line computer bulletin board system. The four programs include IDEA-TREE,



ANSCO 2400 BPS Modems, American National Supply Corp.

a multiple-topic system with private message capability; **PC-DATE**, a computerized match-making system; **PC-LINE**, a linear public message system; and **MU-CHAT**, a multiuser message exchange system.

Each program is a turnkey system, minimizing the technical knowledge required for operation. Features are user-selectable, and different hardware configurations can be accommodated.

List Price: IDEA-TREE, \$139; PC-DATE, \$99; PC-LINE, \$69; MU-CHAT, \$59

Requires: 128K RAM, two disk drives, PC-DOS 2.x.

ProtoSoft

P.O. Box 16756
Seattle, WA 98116
(206) 932-5310

Circle 686 on Reader Service Card

PC AT to MULTIBUS Adapter

Bit 3 Computer Corp. offers an IBM PC AT to MULTIBUS Adapter that makes the PC AT compatible with the IEEE 796-standard MULTIBUS system. This adapter permits the range of graphics equipment, array processors, large-format disks, and high-performance processors available for MULTIBUS to be used with the PC AT. The adapter consists of two cards interconnected with flat ribbon cables. One card fits the expansion rack of the PC AT, and the other occupies a slot in a MULTIBUS card cage.

The PC AT card contains 8K of static RAM, expandable to 32K. This RAM is dual-port concurrent access memory, addressable by both the PC AT and the MULTIBUS cards. In addition, up to four megabytes of MULTIBUS RAM can be set to appear as PC AT memory.

List Price: \$1,175

Requires: MULTIBUS card cage.

Bit 3 Computer Corp.
8120 Penn Ave. S.
Minneapolis, MN 55431
(612) 881-6955
Telex: 499-7016

Circle 682 on Reader Service Card



Smart Data Meter SDM 931, IQ Technologies, Inc.

Smart Data Meter SDM 931

IQ Technologies has introduced a hand-held meter that performs RS-232 serial line diagnostics, quickly identifying all important data on a port's current data transmission settings. The Smart Data Meter generates test patterns and receives data transmissions for DCE and DTE devices, giving baud rate, word length, parity, stop bits, and other information on its LCD display.

Single-button operation lets users select from four menu options: Read, Parameter Scan, Parameter Selection, and Print. Logic circuitry built into the unit makes all necessary RS-232 connections, eliminating the need for attached breakout boxes or custom cables.

List Price: \$425

IQ Technologies, Inc.
11811 N.E. First St.
Bellevue, WA 98005
(206) 451-0232

Circle 684 on Reader Service Card

micro/VERSAL and AST/Utilities

PC-DOS can read, write, and format disks for such micro-computer operating systems as CP/M, HDOS, and TRS-DOS with these system converters and utilities from Advanced Software Technologies. Included with the micro/VERSAL utilities collection are:

ties collection are:

- **UNIVERSAL**, a program that allows the user to choose a standard CP/M disk format from a menu for reading, writing, or formatting disks.

- **HDOS**, similar to UNIVERSAL, but intended for use by Zenith/Heath HDOS PCs.

- **ANYCPM**, a program allowing the user to specify and save custom parameters for unusual disk formats.

The **AST/Utilities** package includes:

- **DUMP**—Allows the user to display the files on a disk of any format.

- **RDSECT**—Allows any sector on any disk to be read by specifying the disk side, track, and sector numbers.

- **REFORM**—A utility for reformatting or indexing fixed-length files.

- **DED**—A disk editor that permits data anywhere on a disk to be edited.

- **FORMD** and **COPYD**—Allows disk formatting or copying by specifying the format parameters, respectively.

- **COPYD**—Allows any disk to be copied by specifying its format parameters.

- **RDROOT** and **WRROOT**—Two object modules that can be linked with assembly programs to read and write foreign disk formats.

List Price: micro/VERSAL, \$79.95; AST/Utilities, \$49

Requires: 64K RAM, two disk drives, PC-DOS.

Advanced Software Technologies
417 Broad St.
Bloomfield, NJ 07003
(201) 783-7298

Circle 683 on Reader Service Card

DG/PC TRANS

This communications package for users of both the IBM PC and the Data General/One portable computer allows both systems to transfer data and programs in either direction at 9,600 bits per second.

The **DG/PC TRANS** package consists of a special RS-232 cable that fits both systems, a 3½-inch disk for the Data General/One, and a 5¼-inch disk for the IBM PC.

List Price: \$165

Requires: 128K RAM, one disk drive, PC-DOS 2.0, RS-232 serial port.

Prospect Research Corp.
100 Prospect St.
New Haven, CT 06511
(203) 624-6765

Circle 685 on Reader Service Card

Compaq User's Handbook

Users of the Compaq portable computer will find practical help in the Compaq User's Handbook. It starts with a training course in the fundamentals of using the Compaq.

then devotes chapters to such subjects as applications software. It also discusses BASIC programming with emphasis on the computer's graphics, sound, and music capabilities. Hardware details outlined include how to install a serial printer, a second disk drive, additional RAM chips, plug-in circuit boards, and other equipment into the Compaq.

List Price: \$15.95
Howard W. Sams & Co., Inc.
 4300 W. 82d St.
 Indianapolis, IN 46268
 (317) 298-5400

Circle 688 on Reader Service Card

FORMULA/ONE

FORMULA/ONE, the Alloy Computer Products problem-solving program, allows engineers, scientists, business professionals, and others to calculate complex mathematical equations. Users simply enter the appropriate equation for defining a specific problem, enter the known variables, and press a single key to resolve the unknown variables. Using lists of variables, users can perform the equation for a range of values and then plot the results on a graph for comparison. The software makes full use of the IBM PC keyboard, permitting the user to edit on-screen text and data with familiar DOS-like command keys.

FORMULA/ONE is based on binary code decimal arithmetic and yields 14-digit accuracy. The program incorporates an error-checking feature that detects erroneous or missing variables in equations and automatically moves the cursor to the point in the equation where the error was made.

A built-in report generator allows the user to produce displays, reports, and graphs without an intermediate word processor. Also included in the program is a full set of statistical and calculus functions, as well as routines for performing multiple linear regression analyses.

List Price: \$395
Requires: 256K RAM, one disk drive, PC-DOS.
Alloy Computer Products, Inc.



Compaq User's Guide, Howard W. Sams & Co., Inc.

100 Pennsylvania Ave.
 Framingham, MA 01701
 (617) 875-6100

Circle 679 on Reader Service Card

The Liberty Board

A memory expansion board compatible with the Intel-Lotus Extended Memory Specification has been released by Quadram Corp. The Liberty Board supplies an additional 2 megabytes of RAM, addressable as standard system RAM by software written to the Intel-Lotus specification.

Other features include a split memory mapping option that uses a portion of the board's memory to bring a system's basic

RAM total to 640K. There is also a provision that lets the user's system access the extended memory ranges created by the board in the same manner used by the PC AT. This latter feature, which can be accessed by software not written to the Intel-Lotus specification, gives the user the ability to set up RAM-disks and print spoolers while leaving 640K RAM free for foreground processing.

List Price: 64K RAM, \$395; 2 MB RAM, \$1,295
Quadram Corp.
 4355 International Blvd.
 Norcross, GA 30093
 (404) 923-6686

Circle 678 on Reader Service Card

Directory of Microcomputer Retailers

The publishers of **The Personal Computer—An Industry Source Book** have issued a compendium of hardware and software retailers throughout the United States. Entitled **The Directory of Microcomputer Retailers**, it lists more than 5,000 retail dealers organized by state and city. Each entry contains the name of the store, address, phone number, and such information as the store's owner, store manager, and sales manager. "One-computer" stores, such as Radio Shack and IBM Product Centers, are not included.

List Price: \$195
The Personal Computer—An Industry Source Book
 P.O. Box 3249
 Walnut Creek, CA 94598
 (415) 945-1602

Circle 677 on Reader Service Card

MONTEST-C15

A portable test instrument allowing field testing of the RGBI TTL lines of the IBM and similar color monitors. The unit, small enough to fit in a shirt pocket, displays a 6 x 7 cross-hatch pattern or a full raster in any of 15 colors. It is connected to the monitor with a standard 9-pin RGB cable.

The unit's small size and battery operation make it suitable for production, inspection, or service applications. Display testing and calibrations can be

The Liberty Board, Quadram Corp.



A DEFINITIVE ENCYCLOPEDIA IS YOURS!

FOR LESS
THAN 92¢
A VOLUME!



ADD-ONS AND ADAPTORS
BUSINESS APPLICATIONS
COMPARISON CHARTS
DATABASE DEVELOPMENTS
EXPANSION CHARTS
FINANCIAL PLANNING
GRAPHICS INNOVATIONS
HARDWARE REVIEWS
INTegrated SOFTWARE
JOB/BATCH FILES
KEYBOARD OVERLAYS/TEMPLATES
LOCAL AREA NETWORKS
MOUSE INTERFACES
NORTON CHRONICLES
OPERATING SYSTEMS
PRIce WATERHOUSE REPORT
QUALITY CONTROL PROGRAMS
RECREATIONAL SOFTWARE
SUPPORT SERVICES
TUTORIALS FOR EXPANSION
USER-TO-USER TIPS
VIDEO INTERFACES
WORD PROCESSOR EVALUATIONS
XT, AT, AND COMPATIBLE PCs
You can CALL TOLL FREE

1-800-852-5200 to subscribe

to PC Magazine, a
Ziff-Davis publication.

AUTHORITATIVE!



YES! I need a ready-reference to help me meet my professional PC needs. Please accept my one year subscription to PC Magazine—24 bi-weekly issues for only \$21.97! I save 32% off the regular subscription price!

☐ Payment enclosed ☐ Bill me later

Mr./Mrs./Ms. _____ (please print full name) PC 45A19

Company _____ Title _____

Address _____

City _____ State _____ Zip _____

Add \$17 additional postage outside the U.S. Please allow 30 to 60 days for delivery of first issue.

INFORMATIVE!



YES! I need a ready-reference to help me meet my professional PC needs. Please accept my one year subscription to PC Magazine—24 bi-weekly issues for only \$21.97! I save 32% off the regular subscription price!

☐ Payment enclosed ☐ Bill me later

Mr./Mrs./Ms. _____ (please print full name) PC 45A19

Company _____ Title _____

Address _____

City _____ State _____ Zip _____

Add \$17 additional postage outside the U.S. Please allow 30 to 60 days for delivery of first issue.

UP-TO-DATE!



YES! I need a ready-reference to help me meet my professional PC needs. Please accept my one year subscription to PC Magazine—24 bi-weekly issues for only \$21.97! I save 32% off the regular subscription price!

☐ Payment enclosed ☐ Bill me later

Mr./Mrs./Ms. _____ (please print full name) PC 45A19

Company _____ Title _____

Address _____

City _____ State _____ Zip _____

Add \$17 additional postage outside the U.S. Please allow 30 to 60 days for delivery of first issue.



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

First Class Permit No. 66 Boulder, Colorado

Postage will be paid by addressee



P.O. Box 2443
Boulder, Colorado 80321



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

First Class Permit No. 66 Boulder, Colorado

Postage will be paid by addressee



P.O. Box 2443
Boulder, Colorado 80321



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

First Class Permit No. 66 Boulder, Colorado

Postage will be paid by addressee



P.O. Box 2443
Boulder, Colorado 80321



YOUR PC ENCYCLO- PEDIA!



PC Magazine—

The ultimate source of business and professional IBM PC applications—a virtual encyclopedia of information for PC users!

The unbiased reviews, proven applications, and analytical evaluations in *PC Magazine* bring you the most comprehensive and accurate coverage available—every two weeks! Make sure you have a complete reference on-hand to help you meet your professional PC needs.

Subscribe to *PC Magazine* today!

performed in the field, minimizing or eliminating shop time. Routines that can be performed with the MONTEST-C15 include convergence, color bal-



ancing, and color purity adjustments.

List Price: \$149.95
Network Technologies Inc.
 P.O. Box 203
 Chagrin Falls, OH 44022
 (216) 543-1646

Circle 676 on Reader Service Card

Lyon Large Print Software

Visually impaired users and others who cannot comfortably read 80-character-per-inch text displays on monitors now have a RAM-resident screen driver that converts text from any applications program into letters 2 to 4½ inches high. Also available from Computer Disk Course are custom screen drivers for *WordStar*, 1-2-3, and other programs that give users of these applications access to large-size text screens optimized for these programs.

The *Lyon Large Print* program comes equipped with six different print sizes and three different spacing settings for text displays. Color monitor users can also choose from among a selection of 16 different foreground and background colors.

Only 11K in size, this RAM-resident program can be toggled

on or off with a single key-stroke, regardless of the applications software in use. Also included with *Lyon Large Print* is an interactive large-print text editor. A special print feature generates large-print hard copy on dot matrix printers.

The other products available for low-vision users include *WordLyon*, a custom screen driver for *WordStar*, and *LargeLyon*, an interactive driver for Lotus's 1-2-3. These drivers reserve the bottom five lines of the display screen for large-size text, allowing normal-size text within the screen's top 20 lines. **List Price:** *Lyon Large Print*, \$495; *WordLyon*, \$150; *LargeLyon*, \$200; demo disk, \$20

Requires: 64K RAM, one disk drive, PC-DOS.
Computer Disk Course
 10145 121st St.
 Edmonton, Alberta
 T5N 1K5 Canada
 (403) 488-4871

Circle 675 on Reader Service Card

Log On

Three utilities allowing the user to track computer use, automobile use, or entertainment expenses for such purposes as IRS documentation.

- **Log On Computer** tracks user's ID, purpose, time, and date. It generates a monthly summary and an annual report calculating the percentage of use per user and project.

- **Log On for Autos** keeps track of driver, purpose of trip, and mileage. Summaries can be calculated by percentages for each category.

- **Log On for Entertainment** records the amount, the time and place, the business purpose, and the relationship between the user and the other parties for each business entertainment expense incurred.

List Price: Each, \$30; all three, \$75

Requires: 64K RAM, one disk drive, PC-DOS.

LQ Processing
 514 Bear Ave. N.
 Vadnais, MN 55110
 (612) 426-5359

Circle 674 on Reader Service Card

CLASIX DataDrive Series 2000

Reference Technology, Inc. has announced a new series of read-only data retrieval devices based on laser optical disk technology. The CLASIX DataDrive Series 2000 units read data stored on CLASIX DataPlates, laser optical disks capable of holding over 2 gigabytes (2 billion characters) of pre-recorded data per disk.

The drive is designed for multiple-PC use and features average access times of 125 milliseconds. It can be connected to any system that supports the ANSI SCSI (Small Computer System Interface) link and can read mixed digital, audio, and visual information stored on a DataPlate when augmented with a video option kit.

The CLASIX DataPlates are based on the laser videodisc originally developed by N.V. Philips of the Netherlands for entertainment and training purposes. The medium is standardized through the use of Reference Technology's *STA/F File* system, which provides a means of formatting and accessing data on the laser disk. *STA/F File* allows applications programs running under such diverse operating systems as PC-DOS, VAX/VMS, and UNIX to produce and access one format. This development makes it possible to produce DataPlate laser disks from many different sources.

Reference Technology also offers the TRIDECC Premastering System, a minicomputer-based service that converts data into the format necessary for volume DataPlate production. The resulting videotape master can be mastered into final DataPlate discs by one of several third-party media manufacturers, including 3M Corp., Sony, Pioneer, Hitachi, and Philips.

List Price: Available from the manufacturer

Reference Technology, Inc.
 1832 N. 55th St.
 Boulder, CO 80301
 (303) 449-4157

Circle 673 on Reader Service Card

Universal Printer Stand

An inexpensive printer stand capable of supporting virtually any 80- or 132-column printer has been announced by PerfectData Corp. The Universal Printer Stand can accommodate any bottom- or rear-feeding printer. Constructed of smoke-colored plastic, the stand places the printer at a 7-degree forward slant for easy viewing of a printout in progress.

List Price: \$19.95
PerfectData Corp.
 9174 Deering Ave.
 Chatsworth, CA 91311
 (818) 998-2400

Circle 681 on Reader Service Card



CLASIX DataDrive Series 2000, Reference Technology, Inc.

PC BlueBook

■ ADVERTISING RATES AND INFORMATION:

Standard listings consist of a bold lead line (23 characters maximum); 7 lines of body copy (45 characters per line); 4 lines for company name, address and telephone number \$200 per insertion—4 issue minimum. Additional charge for extra lines and company logos. Prepayment and frequency discounts available. American Express, MasterCard, Visa accepted. Copy subject to publishers approval. Send typewritten or printed copy, reproducible logo art (if applicable) and remittance to Kathryn C. Umberlander, Classified Sales Manager, Ziff-Davis Publishing Company, One Park Avenue, New York, NY 10016. For additional information, assistance, or to place an order by phone, call collect (212) 503-5115.

ACCESSORIES FURNITURE

IBM COMPUTER COVERS

Our computer covers are made of tough, durable, water resistant 1/8 ounce rip stop nylon. Our product protects your computer system from dirt and dust! Satisfaction guaranteed. IBM PC cover \$18.99. IBM PC AT cover \$24.95. Call for pricing of all other computer cover. MC, VISA, AMEX. Add \$3 S.H. ASI, COMPUTER DIVISION. Order toll free USA 800-826-6559. 800-251-0400. 800-221-4821.

ACCESSORIES SUPPLIES

DYSAN DISKETTES

5 1/4" Double Sided Double Density (104/20)
1 Box \$27.90 Each
2 1/2 Boxes \$26.90 Each
10 1/2 Boxes \$25.90 Each
20 40 Boxes \$24.90 Each
FREE Shipping & Handling - Large Accounts Call.



Dysan
CORPORATION

WGG8
216 N. Owen Street
Mount Prospect, IL 60056 (312) 392-2621

BAR CODING

BAR CODE/LABEL PRINTING

THE LABEL MAKER prints bar codes OCR-A line and large characters from data entered at keyboard or from disk files. Create and save unique printing formats and record layouts. Performs record add, charge, delete, sort and select on disk files. A LABEL MAKER prints AAG shipping/parts identification labels required by Auto Manufacturers. Programs require IBM PC or work-alike. TUSOFTWARE, INC. PO Box 2044 Arlington Heights, IL 60006 (312) 364-1055

BAR CODE READERS/MAGNETIC STRIPE READERS

TIPS provides Bar Code and Magnetic Stripe Readers and combinations of these for simple installation on IBM PC, AT and 3180 terminals DEC Rainbow Professional and VT 200 series terminals. NCR DecadonMate V and PC IV, TI Professional AT&T/Olivetti Wang PC and VS 4200 Apple Macintosh. Northstar Dimension Bar code label printing program \$50 w/invoice purchase. TIPS Electronics 4047 Transport Street Palo Alto, CA 94303 (415) 856-6833

BUSINESS OPPORTUNITIES

GRAPHICS DEALERS NEEDED!

Nations largest stocking distributor of Mitsubishi high resolution color graphics displays currently seeks dealers/WAs aggressively selling the CAE CADD CAM markets. Competitive pricing structure and quantity incentives to qualified accounts. Call for complete information Insee: Data Systems Division 23132 La Cadenita Laguna Hills, CA 92653 714-859-3800

START YOUR OWN OEM BUSINESS

With our IBM PC/XT Compatible System FOR ONLY \$695 (complete system) 256KB RAM, Two 360KB 5 1/4" floppy drives, Monochrome Graphic & Printer Port Adapter. High quality detachable keyboard, Color Monitor (Thomson) \$330 RGB Color Graphics Card \$85 GMG Computer Systems Pte. Ltd 108 Robinson Road #08-01 GMG Building REPUBLIC OF SINGAPORE Tel: 2759111 Fax: RS22068 (MGCS)

MONEY MAKER FOR CONSULTANTS

Law firm management is the key to your share of \$5 billion and specialized software-hardware sales projected by 1990. LTM time and billing software for large and small professional firms has received a published national fair review. Use it for your own billing and sell it to attorneys, CPAs, and all others who bill for their time. Dealer discounts on every sale. LTM is consistently chosen over heavily advertised products some costing 10 times its \$495 price. Send for details. MESA META, Inc. 8990 Lloyd Place Los Angeles, California 90069 213-278-5249

Personal computer owners CAN EARN \$1,000-\$5,000 MONTHLY

by selling simple services performed by their computer. Work at home-in spare time. Get free list of 100 best services to offer. Write C11 B M PO Box 60369 San Diego, CA 92108-6369

COMPUTER/ INSURANCE

SAFEWARE

If your computer is important to you, insure it! SAFEWARE provides full replacement of hardware, media and purchased software. As little as \$39 a year covers fire, theft, power surges, earthquake, water damage and auto accident. Call 8am to 8pm Monday thru Friday Saturday 9am to 5pm. SAFEWARE: THE INSURANCE AGENCY INC. 2909 N. High Street Columbus, OH 43202 (614) 262-0559 (DH), (800) 848-3469 (NAT)

COMPUTER REPAIRS

IBM PC/XT/PPC & COMPAQ PORTABLE REPAIR

Circuit boards and electronic sub-assemblies professionally repaired on ATE (Automatic Test Equipment). An alternate solution with lower pricing and fast turnaround. Dealer & Maintainer packages available. From keyboard to power supplies. Call UNITRACE INCORPORATED 2188 Del Franco St. San Jose, CA 95131-1575 (408) 945-1090

PC/XT 5 1/4" HARO DISK REPAIR

Fast HARO DISK repair service puts your PC/XT back on-line quickly! Seagate, Miniscor, IBM! Many other makes of hard disks repaired also! Tandon, Rodime, Amper, CMV, Diction, RMS. 120-day warranty on all repair services. Call or write for more information and our company brochure. APPLIED DISK TECHNOLOGY INC. 1017 N. Baver St., Suite 8 Santa Ana, CA 92703 (714) 550-9303

COMPUTER SERVICES

SOFTWARE LOCATORS

Find the right software to meet your needs. Save your valuable time while making an informed decision. Call us with all of your requirements and get our Custom LOCATOR report of only those programs that are right for you. All applicable product literature automatically sent. Retail store plans also available. The LOCATOR costs only \$19.95! Software Locators, Inc. 1905 E. 17th St., Suite 317 Santa Ana, CA 92701 (800) 824-7240 (800) 257-3800 in CA

CHANGING WORD PROCESSORS?

We convert to and from XEROX PC-DOS DEC DRD IBM MULTIMATE STRAIGHT ASCII WANG MICROM Also most CP/M systems. Call for our low prices. Text conversions available.



Data Conversion, Inc.
880 Commerce Drive, Buena Park, CA 92602

DATA CONVERSION INC.
6310 Caballero Blvd
Buena Park, CA 92620
(714) 522-7762
(Toll Free: 800-824-4851 in Calif)

COMPUTER TRAINING

TRAINERS EDITION

Of the award winning series "How to use your IBM PC in 10 easy video lessons" is NOW available from Video Learning Library Ltd. This great tool for trainers includes a two hour video, Trainers Guide and overhead. This edition is designed so that training can be customized to your company's hardware and software needs. It's the best priced training tool on the market for only \$199.95.

Video Learning Library Ltd.
150 Shoreline Highway, Building E
Malibu Valley California 90401
415-332-7544

DISKETTE COPY SERVICE

ALLENBACH INDUSTRIES, INC.

Allenbach created the industry, and we've since been imitated—but never duplicated. Copies supplied on OEM quality Allenbach LIFETIME GUARANTEE diskettes now available in a variety of colors. Virtually all formats and systems. Copy protection, serialization, downloading and packaging available. Rapid delivery on 100 to 1,000,000 copies.



ALLENBACH INDUSTRIES, INC.
5957 Lantana Court
Carlsbad, CA 92006
(800) 854-1515 IN CA (800) 468-2627

BLANKET ORDER SERVICES

Diskette duplication, packaging, stocking and drop-shipping services based on your long-term needs. Place a blanket order with releases as you need them for large or small quantities at a fixed price. No extra charge for "mastering", label printing or application.

STAR-BYTE, INC.
2564 Industry Lane
Newtown, PA 19401
(215) 539-4300 (800) 243-1515

9 TRACK TAPES TO IBM-PC

Convert mailing lists or other main frame data on 1600 BPI 9-track tapes to PC-DOS 5.0 diskettes. New automated process guarantees data verification. Easy instructions for loading to your data base (dBASE, dBaseIII, etc.) or hard disk. Only \$60 per million chars. \$95 minimum. Bernoulli box \$30.1M.

A.S.I. Inc.
1259 El Camino, Suite 260
Menlo Park, CA 94025
(415) 323-6338

PERFECT COPIES GUARANTEED

Why risk duplicating your important programs on your computer when our equipment is designed solely to duplicate disks and verify their perfection: 100% Over 600 formats 3 1/2", 5 1/4" & 8". Plus serialization, copy protection, labeling, packaging, shrink-wrapping and last, personalized service.



WESTERN TRANSDATA, INC.
1701 E. Edinger Ave. Building C
Santa Ana, California 92705
(714) 547-3383 (Collect)

HARDWARE

ADD-ON BOARDS

IEEE-488 INTERFACE

Halfsize IEEE-488 interface and software turns your PC AT or compatible into an instrumentation work station for the lab, test and measurement. We are the major OEM supplier with interfaces for 10 different architectures and the most comprehensive coverage of operating systems and languages. \$385 software \$75.

NATIONAL INSTRUMENT
12109 Technology Blvd. Dept PC
Austin, Texas 78727
(800) 331-5066 or (512) 250-9119

\$200 PER MEGABYTE

Memory expands on for your IBM PC, XT or AT at \$200 per megabyte. All the memory you've dreamed of at a price you can live with. JRAM-2 and JRAM-AT hold up to 2 megabytes per board with SerPlay/Disk also available. Megamemory and I/O ports all in one slot!



TALL TREE SYSTEMS
1120 San Antonio Road
Palo Alto, CA 94303
(415) 964-1960

VIDEOGRAPHICS/TEXT

PC-VideoGraph is a single-slot board that installs in IBM PC, XT, or AT. Runs all stop software such as Lotus 1-2-3 and Microsoft Flight Simulator. Dual outputs for display IBM monitor and for videotaping. Price: \$695. Optional graphics overlay on video \$1,295.

NEW MEDIA GRAPHICS



NEW MEDIA GRAPHICS CORPORATION
279 Cambridge St.
Burlington, MA 01803
617-272-8844

FIXED DISK BIOS/BOOT

FIXT boots from most popular Hard Disks—DAVONG, XEBEC, KOMEGA, GAT LAKES, etc. Adds XT-like BIOS interface to your disk for PC. Security, multiple volumes, removable media support optional. No-soft plug-in installation. Speedy controller and computer with order. \$80-\$180. Add \$3 ship. CA tax.



GOLDEN BOW SYSTEMS
P.O. BOX 3039
SAN DIEGO, CA 92103
619/296-9349

HARDWARE

COMMUNICATIONS

DATA ANALYZER FOR \$1195

Both a serial data monitor and protocol simulator, this board and software has extensive simulation programming capabilities. Handles SOLC, BSC, and ASYNC. Now you can buy both a computer and a protocol analyzer for less than the price of competitive analyzers. For trial unit call:

PROTOCOL CHANGERS
1055 SANTA ROSA
COSTA MESA, CA 92626
714-546-5068

SMART ANSWERING MACHINE

SAM transforms your IBM PC into an intelligent phone answering & real-time messaging center. FEATURES: 999 personal messages, call screening, message forwarding, timed or grouped message delivery, sortable phonebook/autodialer, time/date log, voice prompted remote access. AND MORE! All hardware & software included. INTRODUCTORY SPECIAL \$295. VISA/MC.



DALECTRON, INC.
2035 California St., Ste. #17
Mountain View, CA 94040
(415) 960-3640

HARDWARE

COOLING DEVICES

SILENCE AND COOL YOUR PC

Does your PC sound like a high speed turbine? Does it use expansion cards that create extra heat? Solve your noise and cooling problems with the SILENCER from PC Cooling Systems. The super quiet SILENCER operates with 94% less noise than the standard fan it replaces & yet provides double the airflow for your vital IC's. The SILENCER mounts to existing holes on the back of the IBM PC, XT or AT and is guaranteed for the life of your PC. \$79.95 + \$3 shipping (CA res. add 6%) Visa/MC/Check.

PC Cooling Systems
31510 Via Arroyo Dr.
Bonsall, CA 92003
(619) 723-9513

HARDWARE

DISK DRIVES

1.2MB PC-AT DISK DRIVES

At your PC by replacing your diskette controller and adding a high-density disk drive. JDSKETTE handles 1 to 4 diskette drives plus an I/O module. \$249 for JDSKETTE-SA \$250 for Teac 556F (1.2MB) \$200 for Teac 556 (360-K), \$180 for SerPlay/Disk module.

TALL TREE SYSTEMS
1032 Ewell Court, Suite 124
Palo Alto, CA 94303
(415) 964-1980

HARDWARE

PERIPHERALS

PCjr ADD-ON DRIVES

Upgrade your PCjr with our user-installed add on drive system. It includes a replacement disk controller (operates up to 3 drives), a 2 drive cable, external 360K (drives) & software for operating the extra drives. Price: \$149 (controller only), \$6 shipping.



J & M Systems Ltd.
15100-A Central SE
Albuquerque, NM 87123
(505) 292-4182

BLUEBOOK

HARDWARE PLOTTERS

FORTRAN & C PLOT LIBRARIES

PLT014 & PLT016 are FORTRAN & C callable plotting routines for Houston Instruments, Hewlett Packard, and HPGL compatible plotters. Over 45 routines in each library. Draw axes, label text & numbers in user specified direction & orientation. Package supports Microsoft Fortran, Digital Research Fortran 77 and Ryan McFarland Fortran. Comes w/manual. \$200 each. The Librarian, Inc. 15435 Greenbough #110 Surfside, TX 77477 713-499-7662

HARDWARE POWER PROTECTION

MEIRICK STAND-BY POWER

THE MEIRICK STAND-BY POWER SYSTEM provides back-up power and protection from power failures, brownouts, surges, spikes, and power line noise. The enclosed battery will supply a long run time during a power failure. 240 watt system-\$365 400 watt system-\$465, 600 watt system-\$795

MEIRICK INC. POWER SYSTEMS DIVISION Box 296 Fresno, CA 93743 (303) 668-3251

HARDWARE STORAGE DEVICES

COUPLER FOR 9 TRACK TAPE

Two models available to read and write to a magnetic tape with formatted 9 track drives. Runs all speeds and densities on PC, XT and AT running MS-DOS or XENIX. Data transfers up to 904,000 bytes per second! Complete with cable and software, prices start at \$880. OVERLAND DATA, INC. 5644 Kearney Mesa Rd San Diego, CA 92111 (619) 571-5955

TAPE TO DISK CONVERSION

TAPE TO DISK CONVERSION

Convert any 9 track magnetic tape to or from over 200 formats including 3 1/2", 5 1/4", 8" disk formats, and word processors. Formats available include IBM PC, APPLE, Ales, TRS80, CP/M, Display, IBM VS/77, Macintosh, Wang, LANIER, OS/2 and 300 word. Disk to disk conversions also avail. Call for more info. PIVAR COMPUTING SERVICES, INC. 47 W. Dundee Rd Wheeling, Illinois 60090 (312) 459-6010

MAILING LISTS

MAILING LISTS

How over 855,000 micro owners. Select by brand. 219M Apple, 179M IBM PC, 156M TRS-80, 97M Commodore and more! 9 phone vetted reseller lists including 211 stores, VAR's chain buying offices, Canadian and more! 25,000 Unix users. 14,000 computer companies. Lists by software brand, printer model, modem owners, investors, educational, etc. Over 75 different micro and mini lists. Call or write for FREE catalog. Include phone and type of business you're in. In: Blachner TARGETED MARKETING INC. Box 5125 Ridgewood NJ 07071 (201) 445-7196

SOFTWARE ACCOUNTING

CUSTOM PAYROLL

All systems support multiple pay categories, calculation of all taxes, user-defined deductions, exceptional item handling, a variety of necessary reports, paychecks and W-2 forms. Written in PC Basic with full source included for easy maintenance. Prices start at \$695.00 for basic system and manual. DATASMTX, INC. Box 8036 Shawnee Mission, KS 66208 Phone (913) 381-9118

G/L ACCOUNTING POWER

Now the same financial reporting power used by offices of all the "Big 8" is available to corporate controllers. AMI's DATAWRITE (TM) Corporate General Ledger gives complete flexibility for custom reports. Fixed Asset Management and The Tax Machine (TM) are available too. Nationwide support.



Accountants Microsystems Inc. 3633 136th Place SE Bellevue, WA 98006 (800) 476-8201, (206) 643-2050

EARN CPE CREDITS

Computerized study/assessment program makes updating professional competence fun and easy. Both multi-user office packages, and individual programs available. Select subjects can earn 1 to 20 hours. Certification of completion included. Written, administered by accounting professionals.



PO Box 6512 Huntsville TX 77340 1-800(241)-9700 in VA (800) 642-2677

CPA EXAM PREPARATION

NEW IBM multi-user office package takes work out of preparation. Questions with referenced solutions generated by ACPA exam weights. Study single, multiple or all categories. Times, scores, updates, provides progress report with study recommendations. Individual program sold by section.



PO Box 6512 Huntsville TX 77340 1-800(241)-9700 in VA (800) 642-2677

MicroMash MICRO MANAGED STUDY HELP

CONSTRUCTION ACCOUNTING

CMAS system is designed specifically for commercial contractors where tracking job costs is required. Five modules available are job costing, Payroll, A/R, A/P and general ledger. Interactive modules run stand alone or in any combination. Contact Jeff Kibb Data-Basics Inc. 11000 Cedar Road #110 Cleveland, OH 44106 (216) 721-3400

ARCHITECTS AND ENGINEERS

AEMAS System is designed specifically for architects, civil engineers & other professional firms where monitoring project costs is required. Modules available are: job costing, payroll, A/R, A/P general ledger & automatic invoicing. Interactive modules stand alone or run in any combination. Contact Bill Fraenrich DATA-BASICS, INC. 11000 Cedar Rd #110 Cleveland, OH 44106 (216) 721-3400

ACCOUNTING SOLUTIONS

For CPAs and growing businesses, software for both, with optional link between the two. For CPAs: Client Ledger System, the leading write-up program for PCs. Reporting, passive payroll, more. For small business: Total Accounting System '12 integrated accounting programs, built-in DBMS, networkable.



TCS Software, Inc. 6100 Hildebrand, Suite 600 Houston, TX 77081 (800) 231-6454 or (Texas) 800-392-5073

PC-FUNO

PC-FUNO is a fund accounting system for local govts, schools, colleges, and not-for-profit groups. The system includes: General Ledger, Report Writer, P/O Encumbrance, payables, receivables, payroll/personnel, budgeting, utility billing and fund assets. The system supports up to 99 funds, 9999 departments and up to 36 fiscal periods are on line. PC-FUNO runs on the IBM PC and most IBM MS-DOS & XENIX computers. AMERICAN FINANCIAL, INC. PO Box 773028 Steamboat Springs, Colorado 80477 (303) 879-5770

SOFTWARE BAR CODE

BARCODE SYMBOL GENERATION

Print bar code with the IBM PC/XT/AT. Compatible using PC-IMS-DOS. Supports for DVI 84, 92, 93, 2410, Epson FX, Fujitsu DPL24, IBM Graphics, HP Laser & Toshiba P351. Prints Code 39, 93, 2 of 5, 12 of 5, Codebar, UPCA & OCR on label stock. Keyboard or file driven. Inc/dec numbers. LOGSMARS, AARG and HIBC. DATAFLOW TECHNOLOGIES, INC. 8422 Belona Lane, Suite 303 Towson, MD 21204 (301) 216-2630 / 686-2366

SOFTWARE BUSINESS

TIME ACCOUNTING & BILLING

TABS is designed for use by professionals who bill on the basis of time (attorneys, accountants, etc.). Use 4-hourly data entry and menu-driven program selection makes TABS easy to understand and operate. STS's full-feature software is currently in use by over 1400 firms nationwide. For details contact:



SOFTWARE TECHNOLOGY, INC. 620 No. 48th, Suite 120 Lincoln, NE 68504 (402) 466-1997

LP08- LINEAR PROGRAMMING

A powerful menu-driven system for solving linear programs with up to 255 constraints and 2255 variables. A new product version accepts problems up to 510K2510. Features include: interactive and batch operation, spreadsheet-style input and editing, a storage system for problems and bases, sequential input/output. Samples algorithm restart, a complete report generator, sensitivity analysis. Requires 120K 386 with 8087 support, user's guide. VISA INC. EASTERN SOFTWARE PRODUCTS, INC. POB 15328 Alexandria, VA 22309 (703) 540-5460

HardRunner™

Run Lotus without system diskette! This is the authentic HardRunner™ program that allows you to run Lotus and Symphony from your hard disk without the need for a system floppy in the drive. \$34.95 plus \$5.55/h. For further information see advertiser index listing for Nostradamus. NOSTRADAMUS 5320 South 900 East Salt Lake City, UT 84121 (801) 261-0769

BLUEBOOK

dBASE II/III SOFTWARE

GENERAL LEDGER (integrates w d/INVOICER)	\$99
d/INVOICER (Billing & A/R)	\$99
SALES ANALYSIS (Works with d/INVOICER)	\$99
JOB COSTING (for Contractors)	\$99
JOB ESTIMATING (Works with Job Costing)	\$99

SOURCE CODE included for dBASE II or III. Requires printer, 2.5Kb floppies or Hard Disk.
dATAMAR SYSTEMS—(619) 584-2727
 3550 Camino Del Rio North—Suite 208
 San Diego, CA 92108
 Master Card-Visa-Check-ODD

MYTE MYKE™ BUSINESS SYSTEM

Commercial grade, integrated business application software. Order Entry, Inventory Control, Sales Analysis, Accounts Receivable, Accounts Payable, General Ledger, Purchase Orders, Print Time and Billing, Install & Support avail. PC/DOS, MSDOS, NOVELL Networks, XENIX & UNIX.



MA&O SYSTEMS, INC.
 3885 N. Buffalo Rd.
 P.O. Box 108
 Orchard Park, NY 14127
 (716) 662-6611

PROFESSIONAL TIME/BILLING

Handles 400 clients, 20 partners, 80 job (\$40 out of pocket expense) descriptions, 20 area of practice codes, fixed fee or per hour billings, & more. Prints billings, monthly statements, aged receivables & more. Free telephone support \$149 (VISA, M.C., AMEX). Other original software. Call/Write for FREE CATALOG!
MICRO-ART PROGRAMMERS
 173 Birch Avenue
 Dayton, CA 95400
 (805) 995-2329 (24 hour)

INFORMATION PLEASE (™)

A comprehensive financial records keeping and billing system for your business. Many reporting and printing features, including wild card searching. Fast, flexible, easy to use and inexpensive business tool, supported fully. \$69.95 with documentation and source code. \$19.95 without. (add \$2.50 s/h)
 I/S/S
 P.O. Box 27463
 Minneapolis, MN 55427
 (612) 542-9926

TIME MANAGEMENT

Want to improve your time management? The LifeTime Manager helps you organize and prioritize goals and activities. It will improve your use of appointment books, To Do lists, and more. Use your computer to gain control of your time and be more productive. \$49.95 FREE brochure. Call or Write:
Psychometric Software, Inc.
 2550 South Patrick Ave.
 Indian Harbour Beach, FL 32937
 M/C/VISA (305) 771-3839

TS&A 88-TRANSPORTATION

A GENERAL-PURPOSE system for solving transportation, assignment and transshipment problems. Solves transportation problems with up to 510 origins and/or destinations by applying the Transportation Simplex Algorithm. Menu-driven with features similar to LP88. Requires 192K. \$99 with 8087 support user's guide VISA/MC.
EASTERN SOFTWARE PRODUCTS, INC.
 P.O. Box 15328
 Alexandria, VA 22309
 (703) 549-5459

SOFTWARE

BUSINESS PROJECT MANAGEMENT

PRIMAVERA PROJECT PLANNER™

the most project management you can get from a micro. Plan and schedule networks of up to 10,000 activities. Level resources. Control schedule resources and cost. Call or write to find out why Primavera is used by managers worldwide for improved project performance.
Primavera Systems, Inc.
 Two Ball Plaza Suite 925
 Bala Cynwyd, PA 19004
 (215) 667-8600 Telex (910) 997-0487

AHA! (408) 458-9119

You found it! The number to call for software to manage any complex project, e.g., R & D, CONSTRUCTION, BUSINESS/VENTURE PLANNING. Demo Sampler-Pack includes PMS-II, RMS-II, MMS-PI, HARVARD TOTAL PROJECT MANAGER, HORNET, PERT-MASTER, TIME-LINE, SCORUM SUPERPROJECT. Join our staff of Project Managers and Microcomputer professionals provide NEEDS ASSESSMENT, SET-UP, TRAINING, INDIVIDUAL CONSULTATION by arrangement.



AHA!/INC. P.O. Box 8405
 Santa Cruz, CA 95061-8405 (408) 458-9119
 Project Management SERVICES!

MicroPERT™ 1

Multiproject scheduling for IBM PC, XT, AT & true compatibles. Timescaled Network Diagram, Gantt chart & Cost/Resource histogram on screen or printer. 8 standard reports. Up to 220 subprojects. Of course Extensive manual. 1 Year limited warranty. Call/write for brochure. Price: \$350.00 (Demo \$25.00)
Sheppard Software Company
 4750-P Clough Creek Road
 Redding, California 96003
 Phone (916) 222-1553

SOFTWARE COMMUNICATIONS

TELEX LINK SOFTWARE

Link your computer to telex service via ITT, RCA or WU with Cawthon's telex software. Designed specifically for telex communications. Cawthon software is easy to use, has on-line help, self-test diagnostics. Frequently called numbers, and an excellent User's Guide. Cawthon software is available for many computers and operating systems.



Cawthon Scientific Group

2422 Michigan Avenue
 Dearborn, Michigan 48124
 Phone (313) 565-4000

COMPUTER BULLETIN BOARDS

Join the popular world of PC communications with one of our easy to operate computerized message systems complete with printed manual.

- IDEAS-TREE multiple topic \$139.00
 - PC-DAT matching \$99.00
- Customized and other systems are available. On-line demo at (206) 932-7125. VISA/MC.

PROTOSOF

P.O. Box 16756
 Seattle, WA 98116
 (206) 932-5310

FREE EASYLINK SOFTWARE

Electronic mail, Telex, Mailgram, E-Com via Western Union EasyLink™. Start service through us and get the best EasyLink software, INSTANTCOM free (\$195 value). Menu driven. Fast messaging via text editor and directions. Supports unattended operation, binary file transfer, general communication and more.

INSTANT INFORMATION INC

15110 S.W. 80ones Ferry Road
 Lake Oswego, OR 97034
 (800) 228-5176 (503) 635-8572

FAST, SMART FILE TRANSFER

Want to transfer files between PC's without the expense of a network? FASTWIRE and a serial cable can send your files end-to-end much faster and easier than using floppies. Send files at 115.2K baud in seconds, or a full XT (10 meg) in less than 30 minutes. \$50 quantity discounts. Ask about XENIX. PARAGON COMPUTER CONSULTANTS
 3877 North 200 East
 Provo, UT 84604
 (801) 266-3794

SOFTWARE COMPILER

DeSmet C - \$109

Full X&R compiler, assembler, linker, librarian, listscreen editor, profiler overviews, example software, 140 page manual. BOTH 8087 and floating point libraries. OUTSTANDING PRICE/PERFORMANCE. Consistently rated 1st or 2nd in published benchmarks. PC/MSDOS. No royalties on generated code. Newsletter. Updates \$20 ea. \$109 shipping included. Symbolic (C source level) Debugger Option \$50 extra. C Compiler for Macintosh \$150.



C WARE CORPORATION
 Dept. PCO
 P.O. Box C
 Sunnyvale, CA 94087

SOFTWARE

DATA ENTRY

DATA ENTRY SYSTEM

Heads down data entry for the PC will allow fast and accurate transcription of data files for your mainframe. Features: Auto dup, verification, auto format change, table lookups, range checks, batch bolts, dup-key, record insert and much more. Ask us about our free 30 day trial period. Only \$395.
COMPUTER KEYES
 6519 193 SW
 Lynnwood, WA 98036
 (206) 776-6443

EDENS

Combines flexibility and performance in an interactive Easy-To-Use environment. Features: Search, Append, Insert, multiple Formats, Update, Data Print, Custom screen painting. Edits. Must enter Auto-Dup. (29 keyboard, constant). Check Digit, MUCH MORE! Transfer files to PC/DOS, with Record A/D, Menu Driven. HELP facility. Volume Discounts. Price \$149.95. Demo \$24.95.
Sunus Systems
 4244 Ridge Lea Rd. Ste. 25
 Amherst, NY 14226
 716-634-2820

\$105/PC

Replace your C/P, 129, 129, 3741/3742, 5280, etc. Versions. Extended keywords to comprehensive, full function for high-volume, heavy editing. Features include standard keyboard + verify table lookup, search, insert/delete, format change, sort, balance, statistics & much more. Prices start at \$195—30 day free trial.
Software Consulting Service, Inc.
 8930 Foundrds Drive, Suite 231
 San Antonio, TX 78239
 (512) 656-6484

BLUEBOOK

ENTRYPOINT

Most widely installed data entry system for PC/XT/AT! Heads-down speed, sophisticated multi-screen applications. Features: paint the screen from design data validation, table & file tools, Help keys, logic processing, reformating, batch totals, verification, 129 KB remapping & more. Demo \$24 Operator \$345 Developer \$645 Volume pricing.
DATA/EX
650 5th Street
San Francisco, CA 94107
(415) 541-0780 (800) 362-6688

SOFTWARE

DATA CONVERSION

DON'T REKEY-CONVERT!

We use the latest disk, tape, scanning, & telecommunications technology to reformat data for you. QUICKLY AND ACCURATELY USUALLY AT ONE TENTH YOUR CURRENT COST! We transfer data between word processors, typesetters, micros, minis, mainframes, & software packages. We supply a full range of consulting services including Data Customization and Database Development.
Data Conversion Laboratory
67-27 18th Street
Fresh Meadows, NY 11365
718-939-4321

SOFTWARE

DATA MANAGEMENT

PC-FILE III™

New for 1985: version 3.0, is faster than ever. Enhancements: 32767 record capacity, held size up to 1665 bytes, instant "snapshots" making labels much more. Exchange data with 1-2-3, WORD, WordStar, etc. Over 100,000 copies of PC-File in use. Printed manual \$49 check, M/C or VISA. Toll free 24-hour order line.
1-800-BUTTON
BUTTONWORK
PO Box 5786
Bellevue, WA 98006
(206) 746-4296

C ENGLISH

BREAK OUT of the cBASE/Interpreted Language barmen with "C ENGLISH" Use English Language/cBASE-like syntax to produce applications that Run 20-100 times faster than cBASE. Are portable to Major UNIX Systems, Are fully Multi-User under UNIX. Convert easily from cBASE applications. \$795.00
c/AMAR SYSTEMS—(619) 584-2727
3550 Camino Del Rio North—Suite 206
San Diego, CA 92108
Master Card-Visa-Check-CCD

GENERAL MULTIKEY SEARCH

Fast search on a file of objects with any number of search keys. User enters LISTS OF KEY VALUES. Objects matching a list are in LIST SET. Program EVALUATES the UNION or INTERSECTION of ANY NUMBER of LISTS SETS, or their COMPLEMENTS. File structure: two variable-word fields, CODE and KEYVALUE. cBASE II, \$55.
Tom Lewinson
392 Central Park West Apt. 12X
New York, NY 10025
(212) 222-5050

askSam

A simple-yet powerful-end user text oriented dbrs. Retrieve on any combo of words, parts of words and/or field values. Sort output to printer, screen or disk. Update with full screen text editor or batch operations. For IBM PC, PCjr, AT, XT & compatibles with PC-DOS 2.00 or later, 128K min. \$149.95 - \$5/s/h. Visa/MC
Scotdale Software
536 Paradise Drive
Corpus Christi, TX 78412
1-800-299-2019 or 1-800-AskSam

SOFTWARE

DECISION SUPPORT SYSTEMS

EXPERT CHOICE™

Expert for today's decision makers—gain the competitive edge. Facilitates complex decisions based on both objective & subjective factors about criteria & alternatives. Uses procurement, resource allocation, strategic planning, R&D, marketing, finance, employee selection & evaluation. \$495 DEMO \$150.00



Decision Support Systems, Inc.
1300 Vincent Place—Dept. C2
McLean, Virginia 22101
(800) 368-2022 (703) 442-7500

SOFTWARE

DEVELOPMENT TOOLS

FREE COBOL SOURCE CODE

Includes on-line 20 screen NOTEBOOK, Menu Driven reviews, IBM-PC COBOL, 13 SECTIONS to select from. 9 FREE COBOL Demo programs Over 1800 lines of SOURCE. Covering: Inter-program comms. Graphics, Function Key and Special Register Usage. EPIASE Disk files thru COBOL ALL on diskette—\$24.95. Much More.
Sunus Systems Inc.
4244 Ridge Lea Rd. Suite 25
Amherst, NY 14226
716-634-2820

DEVELOPMENT SOLUTIONS

Use your PC as a complete development system. Cross-assembles target most popular chip families. Debug with uASM full-screen software simulators and TRACE in-circuit emulators from your code into firmware with superfast A/PROM EPROM programmers. Available for CP/M-80, CP/M-86, PC-DOS/MS-DOS, host systems. Priced from \$200. Call for details.

AVOCET SYSTEMS INC.



Avocet Systems Inc.
PO Box 490-G
Rockport, ME 04856
(800) 448-8500, (207) 236-9055

dBASE DEVELOPMENT SYSTEM

Professional Development System for dBase II & III with 2mb of source utilities & programs for quick & creative application development. \$195 (dBase programmers edit w/ library manager windows let you edit up to 4 command files on screen, complete w/ powerful source development features). \$245
GLOBAL TECHNOLOGIES CORP.
16572 Louisiana Drive
Aurora, CO 80017
(303) 337-7758

SOFTWARE

EDUCATIONAL

THE FUTURE IS NOW

MOTHER GOOSE—A new generation revolutionary software for young children. Brilliant color graphics, animation and lively music. Installs computer & reading skills & is child proof. Electronic page turning allows your child to experience the wonders of Mother Goose. It's fun. IBM PC/XT & PCjr. Tandy 1000 (256K) \$34.95 \$2.50
S/H VISA/MC
SUNSTAR SYSTEMS
Route #4, Box 368
Ogdensburg, NY 13669
(315) 333-7177

GRADE WEEK VACATION!

Average and print out your grades in minutes with the fast, easy to use Aves Gradbook.
• 16 classes of 64 assignments: 48 students
• Finds makeup grades at touch of a single key
• Prints grade sheet, averages, student grades
PC-DOS 2.0 128K. Send for free literature
Order \$47.50 - 2.00 Handling (2.95 tax Cal.)
Aves Corporation
PO Box 700457
San Jose, CA 95170-0457

SOFTWARE ENGINEERING

ENG/SCI GRAPHICS

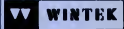
DMNPLOT(S) (screen graphics) & DMNPLOT (P) (plotter driver) provide integrated engineering/scientific 2-D & 3-D graphics with NO PROGRAMMING REQUIRED! Menu-driven, flexible, professional. Choice of formats: tabular, line, contour, bar, pie, 3-D wire frame & much more! DMNPLOT(S) \$195, DMNPLOT(P) \$195. Both \$295.
MICROCOMPATIBLES
301 Prelude Drive
Silver Spring, MD 20901
(301) 593-0683

NEW STRUCTURAL DESIGN

Fast, efficient, versatile structural analysis and design program in spreadsheet format—BEAMS, COLUMNS and FRAMES of any material. Friendly input and output with data storage and COLOR graphics. Specify PC, XT or AT and send \$25 for demonstration diskette to:
C-Squared, B-Squared Software Design Inc.
763 27th Ave.
San Francisco, CA 94121
(415) 751-1337, (800) 621-0651

smARTWORK™

Printed-circuit artwork editor for double-sided boards up to 10" by 16" on an IBM-PC. Color display allows complete interactive control over the placement and routing process. 2K artwork can be made on a dot-matrix printer or pen-and-ink plotter. \$895. Write or call for a brochure.



Wintek Corporation
1801 South Street
Lafayette, IN 47904-2993
(317) 742-8428

BEAM ANALYSIS & SPRG. DESIGN

Beam Analysis Pro calculates shear, moments, reactions, slopes and deflections in beams. Price: \$50.00. -Helical Spring Design Pro for compression, extension and torsion springs. Price: \$75.00. -Both packages include disk and documentation. For IBM PC, PCjr & compatibles. & for Apple II series of computers. 48K required.
SYLCA CORP.
33-47 14th Street
Long Island City, NY 11106

SIMULATION

GPSS/PC is a full-power version of GPSS, the most popular mainframe simulation language, more than just a language, it is a simulation environment specifically designed for interactive use on today's high-speed microprocessors. Using GPSS/PC you can predict effects of changes to real-world systems.
MINUTEMAN SOFTWARE
PO Box 171/B Stow, MA 01775
1-(800) 343-0664 ext. 4800 (U.S.)
1-(800) 232-1238 ext. 4800 (Mass. only)

BLUEBOOK

CREATE PCB'S EASILY

Easily create double-sided printed circuit board artwork of up to 21" square using PC layout on an IBM PC. The artwork is created using a color artwork editor. The final artwork, solder mask and silk-screen (litho) is produced using either a printer or a plotter. Price \$745. Demo Disk/Manual \$95. DRACD TECHNOLOGY, 7210 Jordan Ave., Suite D50, Canada Park, CA 91303. (800) 235-6646 ext. 646 (outside CA) (800) 235-6647 ext. 646 (CA only).

PC BUYERS GUIDE

THE INDEPENDENT GUIDE TO PRODUCTS AND SERVICES FOR IBM Personal Computers. This master directory lists, describes, rates for ease of use and tells you about the latest in software, hardware, accessories, supplies, books, services, etc. It's everything for you and your IBM PC. It even includes an Index of Computer Companies for both adults and children. From the publishers of PC: An ideal gift for \$7.95 (+ \$1.55 shipping/handling) to U.S. destinations, and \$11.00 elsewhere. Residents of CA, CO, CT, DC, FL, IL, MA, MD, NJ, and NY add applicable sales tax. Checks or MasterCard or VISA acceptable (with number, expiration date and signature). U.S. funds only. Mail to: PC BUYERS GUIDE, CN 1914, Morristown, NJ 07960.

SOFTWARE

ENTERTAINMENT

STAR FLEET I

I call STAR FLEET I the world's most elaborate star battles game! —Jerry Pourmette, Byte Sept. 84. Features full color music, promotions. Capture ships, lay mines, launch probes, rescue bases, repair damage, eliminate enemies, model 980 program. Reg. 129K, PC/PCP, 1 drive B0, cost \$49.95 + \$2 s/h. Also for TI PC, SANYO MB 555 (180K).

For CC orders: CIGNUS, P.O. Box 57825, (800) 622-4070. Website: TX 77598, (800) 942-7317. (713) 486-4163. (in Illinois).

GRIDSTAR 85™

Beat your bookie or office pool with the world's most sophisticated NFL analysis package. Verifiable 10 w/ track record 64% vs spread. Exciting, easy to use. 7-Discs, 20 report pages weekly, \$150. We'll rush demo disk with Gridstar manual for \$10. NBA Strategy™ inquire: VISA, MC, Call 7-11 EST.

SUMMIT RESEARCH

65 High Park Ave., Suite 806, (416) 761-7798. Toronto M9P 2R7. (416) 761-7798.

IBM FOOTBALL FUN

Have fun with friends and fellow workers. "FFUN" prints schedule of pro games each week and players pick teams they hope will win. Enter all picks into "FFUN" and a well-printed report of players' results after Sunday games and Monday games. No points to pick includes 1985 schedule. \$29.95 + \$2.00 ship. CRITICS CHOICE, P.O. Box 1381, Pompano Beach, FL 33061.

CRYPTOPUZZLES

For word puzzle enthusiasts! Solving cryptograms on a computer lets you have all the fun while the computer takes care of repetitive letter substitution. Choose from 5 categories with 500 quotations in all. Plus, an infinite number of word arithmetic problems based on 200 phrases. \$22. MA 5% tax. VISA/MC/CHK. SOFTSTART, P.O. Box 803, Framingham, MA 01701. (617) 620-8315.

THREE GREAT CARD GAMES

CASINO BLACKJACK Counter! Tutor teaches card counting and expert plays. GIN RUMMY 4 plays a strong game with regulation rules. CRIBBAGE MASTER plays and teaches, with discard suggestions. Card graphics. All well reviewed. \$35 each. \$60 any two. One drive, 64K, 80 columns. Visa/MC. Free shipping. MANHATTAN SOFTWARE, Orders Only, P.O. Box 765, 1-800-432-5656, Peterborough, info/NH orders, NH 03458, 603-824-9998.

SOFTWARE

FILE MANAGEMENT

KWIC-REF

New, high performance general purpose text filing system. Designed to help people who work with lots of text files—documents, reports, notes, letters & any text materials. Allows you to search & retrieve documents that contain specific words using "and" "or" "but" combinations. Tracks up to 32,000 key words & 32,000 documents. No limit on document size. Currently being used by many Fortune 1000 companies. \$200. Chen Information Systems Inc., 3150 Almaden Expressway, Suite 243, San Jose, CA 95118. (408) 723-2343.

SOFTWARE

FINANCIAL

RUN A LAPP AROUND LOANS

LAPP is a completely flexible, friendly Loan Amortization Prepayment Program. Payments may be periodic or irregular for fixed or varying amounts. A variety of interest compounding intervals is also available. Excellent documentation! Satisfaction guaranteed or full refund. Order now! Send \$95. MC/VISA. Dealers welcome. Mountain Software Inc., 1104 Fenwick East, P.O. Box 4364, Hamilton, Ontario L9B 4L8, Collect (416) 385-3214.

TAX PLANNING TEMPLATE

A diskette to be used with 1-3-3, or Symphony User can toggle between 1983 & 1984 computations, and both years' tax tables. Computes state income taxes. 256K req. Flexible, menu-driven. Follows IRS forms by line number & includes Sch. A, B, C, D, E, G, W, SE forms 2118, 2141, 3468, 6251, 875. PERSONAL TAX PLANNING—PERMA- & ASSOC, 1125 Sunnyhills Road, Dept. PCM, Oakland, CA 94610. (800) 433-0100 x644.

SOFTWARE

GENERAL

DVORAK KEYBOARD SOFTWARE

Want a Dvorak Keyboard for your IBM PC? SureStroke translates keystrokes, gives you Dvorak Typing Coach, transfer letters for key tops, manual, self-modifying audio cassette. Works with Lotus, dBase, WordStar, etc. Stop hunting and looking—Strike the Dvorak today! \$95.00 plus \$4.00 shipping. Visa/MC/AMEX or check. SEASONED SYSTEMS, INC., Box 3720, Chapel Hill, NC 27515. (800) 334-5531. (919) 967-5818.

SHOP CHEAP—EAT SMART

"COUPONCIZER—Save more money with our discount coupons and rebates. 68K "DIET ANALYZER—Use those extra pounds! Tracks calories, 23 nutrients. Ideal for menu planning. 128 K. Immediate shipment, 2 week money back. Call \$49.95 ea. + \$2.50/s/h. AmEx, MC, VISA. Call for free brochure. NATURAL SOFTWARE LTD., 7 Lake St., STE 7E, White Plains, NY 10603. (800) 626-2511. (914) 761-9329 in NY (collect).

CHEAPWARE™

Crummy (More Games) - \$35. Draw Poker - \$35. Layer Maker & Labels - \$45. Basic CRIF - \$25. 5-Year Diary - \$35. Tax Record - \$30. Poker Odds Calculator - \$25. Word List - \$20. Letter/Manuscript Writer - \$30. Basic Program Printer - \$20. For DEMO send formatted disk & return postage. Robert L. Nicolai, 4038 N. Ninth St., St. Louis, MO 63147. BOB NICOLAI (404-5524) in MO 314-621-7618.

SOFTWARE

GRAPHICAL

US-ATLAS

Locator of 32,000 cities. Fed & St Parks on Pre-coded disk. Color Graphics & Monochrome. Great Circle distance to any place on earth. 10 by 40 mm strip map display. Locates all towns within a given circle. Has 9 options. MONEY BACK GUARANTEE. Price \$39.95. Uses IBM PC, 192K, 1 disk Drive, PC DOS 2.00 or later. ILLUSTON PC PROGRAMS, 1930 Haystack Dr., Jefferson City, MO 65121. (314) 635-3417.

SOFTWARE

GRAPHICS

35mm SLIDE FROM YOUR PC

COMPUTER SLIDE EXPRESS converts graphics files produced on the IBM PC into brilliant 35mm color slides with color resolution 400% better than your monitor. Leave your printouts behind. Use high resolution color slides at your next presentation. COMPUTER SLIDE EXPRESS \$61/slide. \$30 minimum order. VISUAL HDRIZONS, 180 Metro Park, Rochester, NY 14623. (716) 424-5300.

HIGH RESOLUTION GRAPHICS

Do you need straighter lines and rounder circles than can be obtained from typical medium resolution packages?

CONSIDER THE DRAWING TABLE!

The Drawing Table uses the 640 x 200 pixel mode to produce high quality lines, circles, rectangles, squares, triangles, parallelograms, trapezoids and arcs.

- In addition to standard figures, the block function allows moving, copying, or erasing rectangular areas with the ability to play, overlay or replace the new block.
- Painting is easy with 100 different brush sizes in four different shades.
- A library function is provided to store commonly used symbols. This allows the creation of specialized libraries to draw flowcharts, schematics, process flow etc. (A flowchart library is included).

- Drawings may extend to multiple screens and can be labelled with the text function.
- Drawings can be saved to disk or plot matrix plotter.

- The Drawing Table is menu driven with all functions selected by a single keystroke. Requires IBM PC/XT/AT or compatible with 192K color graphics board, and DOS 2.0 or later. \$49.95 + \$3 shipping. VISA/MC (TN + 7.25%).

K SOFTWARE HOUSE

Rt #2 Box 8381, Unimonte, TN 37180. (615) 294-5090.

FORTRAN/PASCAL GRAPHICS

GRAPHATIC (screen graphics): 70 Microsoft/IBM 2.0 FORTRAN/PASCAL, RM-PROF, DR. SS. FORTRAN capable subroutines. Prof. graphics program backed up by a 100 pp. user manual. 5 packs in one gem utility. 2-D interactive, total-2-D plot support. 3-D plots. 3-D solid models (hidden line removal). \$135. H-P/H-Plotter/Trity. PLOTIMATIC for complete plotter graphics capabilities. Interface w/GRAPHATIC. \$135. Both \$240.

MACROCOMPATIBLES

201 Private Drive, Silver Spring, MD 20901. (301) 593-0683.

BLUEBOOK

INTERACTIVE FLOWCHARTER

Interactive EasyFlow, a full screen graphics program for flow & organization charts. Very powerful. 3 levels of zoom, automatic line routing, automatic text centering, horizontal & vertical scrolling, 16 std. shapes, user defined shapes easily added, full manual. Requires 256k and graphics adapter \$149.95
Haven-Tree Software Limited
P.O. Box 1093-F
Thousand Island Park, N.Y. 13692
(613) 942-7270 Ext. 50

GRAFFITI

A comprehensive color graphics package for business and other uses. Provides extensive capabilities to create images and text in 100's of colors. Sophisticated color mixing techniques make this product unique. Font generator, slide show, B&W/color prints, and extensive file system support are provided. User-friendly features include an interactive tutorial, online help, and menus. Compatible with LSI 123, BASIC and most other graphics software. Price \$350. Tutorial/Demo \$20
Gemini Microsystems Inc.
P.O. Box 26684
Fort Lauderdale, FL 33320-6684
Phone (305) 776-2020

GRAPHIC PRINTER SUPPORT

At last IBM PC graphics support for your dot matrix printer! Use the Price key to produce quality B&W or color scaled dot matrix reproductions of your display on your Epson, IBM, Okidata, IDS, Comtronic, DEC, Anadex, Data-south, Gemini, TI 850, Riemann, Toshiba, NEC 8023, or C. Itoh printers. If your printer is not listed, let us know and we will support it. GRAFFPLUS is now available for all versions of PC or MS-DOS and will operate with IBM, Tech-nical and Hercules graphics boards. Technology Inc. \$49.95
JEWELL TECHNOLOGIES, INC.
4302 Southwest Alaska St. Suite 207
Seattle, Washington 98116
(216) 937-1061, 1-800-626-2828 ext. 527

TURBO PASCAL & BASIC

Transfer IBM PC/compatible screen or window graphics to your Epson JX-80 color or Epson compatible graphics printer. Gives programmer control of resolution, color, size, & placement. This is not a Print & Go routine, IT'S A PROGRAMMER'S TOOL. Specially Basic or Turbo, \$55 incl. source & shipping. Include check or money order and address. For info on additional features call or write to:
UNIVERSAL Software Systems, Inc.
P.O. Box 1031
Savannah, GA 31401-8259
715-345-2659

SOFTWARE HOBBIES

ROOTS II FOR PC GENEALOGY

Organize your family tree and print camera-ready family books containing charts, text and indexes. Store, retrieve and display 1,000's of family facts with biographical sketches and source documentation. Lightning-fast searches and sorts. Display pictures and maps. 250 page manual. Satisfaction guaranteed. Write for free brochure. \$195 (+ CA tax)
COMMSOFT
2257 Old Middlefield Way, Ste. A
Mountain View, CA 94043
415-967-1900

COIN COLLECTORS

Unique program records entire collection and produces various reports that serve for personal investment information. Built-in market value file provides latest prices for 1600 U.S. coins. COINS software & manual \$55. Stereo Preview Pack only \$19. VISA/MC OK. Quarterly COINS value update diskette only \$2.
COMPU-QUOTE
6014 Berquist Avenue Suite 101P
Canoga Park, CA 91307
(818) 348-3662

SPOT COMET HALLEY—\$52

The heavens at your command. PC PLANETARIUM, one brilliantly conceived, meticulously executed, easy-to-use software package. • Draw a sky map for any location, date, and time. • Include stars, planets, sun, moon, and Comet Halley. • Identify constellations and all objects. • Print a high resolution sky map.
LIGHT Software
369 Pine St., Mezz. Drawer B
San Francisco, CA 94104
(415) 788-4578

SOFTWARE LANGUAGES

BETTER BASIC

• Structured language with BASIC Syntax
• Extensible—Create your own keywords
• Modular—Procedures can be grouped together into library modules for higher productivity
• Unlimited full PC memory capacity (640K)
• Full support for graphics, communications, and screen formatting. \$199. 5887 module \$99. Ruben System \$250, sample \$10.
Summi Software Technology, Inc.
P.O. Box 99 Balaban Park
Wellesley, MA 02157
(617) 235-0729, 1-800-225-5800

SOFTWARE LEGAL

Presenting the Case for Lass

LAASS is an interactive, user friendly Legal Accounting Software System. It accommodates client trust accounting, disbursements and aged accounts receivable. Features include daily/monthly summaries, trust listings and automatic statements of account. Excellent documentation. Satisfaction guaranteed or full refund. Upgradeable demo. Order now! Send \$85 Full system. \$455 MC/VISA. Dealers welcome.
Mountain Software Inc.
1104 Fennel East, P.O. Box 4364
Hamilton, Ontario L8V 4L8
Collect (416) 385-3214

SOFTWARE MAILING PROGRAMS

MY-T-MAILER™ \$30

Our users love this sturdy menu-driven worker. Secretaries say "Terrible!" Print labels, 3x5 cards, envelopes, any format. Customize labels with line-by-line printer fonts. Sort, Search & Select with powerful, flexible, easy user-interface. EZ Browse, Edit, & Delete. Print up to 5000 copies of one label. Also PC/XT, IBM, \$30.
JOHNSON SOFTWARE COMPANY
POB 16507 Dept 3
Seattle, WA 98116
(206) 935-4861

MAIL-SORT

The most powerful program of its kind, yet easy to use. Sorts following U.S. Postal Regulations for 1st and 3rd class bulk mail rates for substantial savings. Name capacity limited by disk space. Prints labels 1-3 across. \$199.00.
Labelbook Software
P.O. Box 220677
El Paso, TX 79913
(915) 581-0869

LABELWRITER II BY CCI

Stand alone label writer. Menu driven with help command. Prints 4 line address labels one or two across. Select and sort by name and/or zip with automatic nested capabilities. Prints multiples of same label. Name & address maintenance with list option by name or reference number. Send \$50 check or M.O. to:
CROWN CONSULTANTS INC.
P.O. Box 273
Crown Point, IN 46307

SOFTWARE MANUFACTURING

MYTE MYKE™ MANUFACTURING Control System

Integrates with Business System. Std cost provides Bill of Material, operations routing, where used, same as except & projection capabilities. Inv. Control, Forecast/Sched, MRP, MPP, Prod Cost, Prod Orders, Shop Floor Control. Install & support avail. PC/DOS, MSDOS, NOVELL Networks, XENIX & UNIX.



M & D SYSTEMS, INC.
3885 N. Buffalo Rd.
P.O. Box 108
Orchard Park, NY 14127
(716) 662-6611

MCBA MANUFACTURING SYSTEM

Designed to be flexible for use in job shop or repetitive environment. Over 15,000 users. Inventory Management Bill of Materials, Order Processing, Purchasing, Job Costing, Shop Floor Control, MRP, Production Costing and Routing, Labor Performance, Accounting, MIS-DOS, XENIX, UNIX. Dealer inquiries accepted. Source available.
MOM SYSTEMS INC.
P.O. Box 792
Southfield, MI 48037-0792
(313) 535-0200

SOFTWARE MEDICAL

MEDICAL SYSTEMS WITH ECS

All PPM products have electronic claims submission (ECS) to Medicare & commercial carriers, paper claims too.
• PC • CLAIM \$89.95, claims only
• PC • CLAIM w/DCS, CPT's & HCPC codes \$229.95
• PC • CLAIMPLUS claims only w/patient file. Complete a claim in one minute \$459.
• THRESHOLD • TM \$1,995.00 claims, A/R patient billing.
• THRESHOLD \$3,995.00 claims A/R patient billing, complete practice management, statistical analysis.
• CLAIM • NET. Nationwide claims clearing house. Full 100% credit on product upgrade.
PC • CLAIM & PC • CLAIM PLUS both house 30 day money-back guarantee. IBM PC/XT/AT/compatibles MS-DOS 256K.
Physicians Practice Management
1810 South Lynhurst Suite 0
Indianapolis, IN 46241
(317) 248-0357
In continental U.S. call (800) 428-3515
Indiana residents call (800) 792-3525

BLUEBOOK

PD5/11" Version 5.0

COMPREHENSIVE MEDICAL BILLING AND MANAGEMENT SYSTEM FOR IBM PC. Balance forward/copy item. Single multi-doctors. Aging revenue analysis, graphs. Day sheets, recall, referring physicians, and ad hoc inquiry. Electronic claims. Customizable procedure & Dx code. Single or multiusers (local area network). Menu driven on-line help & fullscreen data entry. \$2500. FREE one year support and upgrade. Chen Information Systems Inc. 3150 Almaden Expressway, Suite 243. San Jose, CA 95118. (408) 723-2343.

SOFTWARE

ONE OF A KIND

PC COLOR SPECTRUM FREE COLOR PHOTO MONTAGE - CALL TODAY!!!

REAL TIME KALEIDOSCOPE patterns on your RGB display & color/graphics adapter. Uses algorithms to create photo montage. FULL VIDEO FRAMES (complete screens) at TEN FRAMES PER SECOND - 178 - SHADES AND COLORS. THE BEAUTY & DYNAMISM of these displays must be seen. \$35.00. Please send check/money order. AFFIRMware. P.O. Box 586. Drexel Hill, PA 19026. 215-449-6875. Compuserve 72355, 1201.

SOFTWARE

OPERATING SYSTEMS

MULTIPLE USERS UNDER PC DOS

MultiLink advance turns PC-DOS into an efficient multi-user multi-tasking operating system. Additional users are supported by attaching inexpensive CRT terminals or modems to serial ports on the PC, XT, or AT, and can run normal applications designed for PC-DOS. Includes print spooling, keyboard enhancer, and communications software.



THE SOFTWARE LINK, INCORPORATED
8601 Dunwoody Place Suite 336
Atlanta, GA 30338
(404) 998-0700

SOFTWARE

PREVENTIVE MAINTENANCE

MAINTENANCE & INSPECTION

An easy-to-use computerized method to organize, operate, and control an effective preventive maintenance system. Applicable to any type of business or industry. Full screen input and displays, plus function key help command. Maintains historical data, creates work orders, and provides numerous reports. For info, write to PENGUIN COMPUTER CONSULTANTS. P.O. Box 20485. San Jose, CA 95160. (408) 997-7703.

DISK DRIVE DIAGNOSTIC

Memory Mender, Item J & M Systems, is a disk diagnostic program for the IBM PC, PCjr, & IBM compatibles. It checks your drives for head alignment, spindle speed, hysteresis, azimuth, and more. And, you can use Memory Mender to actually align your disk drives! \$99 plus \$4 shipping.



J & M Systems Ltd.
15100-A Central St.
Albuquerque, NM 87123
(505) 292-4182

SOFTWARE

REAL ESTATE

EZ-RE INVESTOR TEMPLATES

Complete analysis package for the Real Estate Investor. For Equity Share, Rent House, Apartments, Warehouses, and Office Buildings. Five mortgages can be ARM, FRACAS, amort, deferred, or only ten year projection of cash flow, deductions, sell price, tax at sell, gain or loss per year, and after tax IRR. Expenses, int, rent, and appreciation adjust annually. Also 45 year loan amortization templates. Pool report. Requires LOTUS 123 and 256K. \$50 PPD. Money back guarantee. Visa, MC. LB ASSOCIATES, INC. 8817 Skokie Lane. Vernon, VA 22180. (703) 938-9063.

PROPERTY MANAGEMENT

Comprehensive program for managing residential and commercial properties. Many management reports including operating statement, dominant rent, lease expiration and transaction register report. Provides check writing, check reconciliation, posting of late fees, recurring expenses—\$395. Investment Analysis—\$245. Yardi Systems. 3324 State St., Suite "O". Santa Barbara, CA 93105. 805-687-4245.

PROPERTY MANAGEMENT PLUS

A new easy-to-use system for single or multi-family properties. Prints checks, rent statements and receipts. Reports—late rents, expired leases, vacancies, income/expenses, and operating statement. Includes a bank reconciliation feature and graphics capabilities! Up to 70% reduction in management time. \$675. REALTY SOFTWARE COMPANY. 1926 South Pacific Coast Hwy #229. Redondo Beach, CA 90277. (213) 372-9419.

SOFTWARE

SCIENTIFIC

MATRIX 100

Powerful Matrix operations with single statements in IBM PC BASIC. Perform multiple regression, solve simultaneous equations, invert matrices, etc. MATRIX 100 commands are fast, reliable and easy to use. Price \$90. \$667 support. \$175, complete support \$230 (\$4 shipping & handling. CA res. add 6.5% tax.) STANFORD BUSINESS SOFTWARE, INC. 4151 Modelfield Rd., Suite 215. Palo Alto, CA 94303. (415) 424-9499.

SOFTWARE

SECURITY

BIT-LOCK® SECURITY

Guard your valuable software from PIRACY. Our inexpensive security system protects you from lost profits. Copies will only operate with a BIT-LOCK device attached. BIT-LOCK's powerful multi-layered security has proven its effectiveness on IBM PC/XT, TRS-80, Apple and Commodore computers thru the test of time. MICROCOMPUTER APPLICATIONS. 7805 So. Windermere Circle. Littleton, CO 80120. (303) 922-6410.

SECURE AT/XT/PC

Control system boot, data access! FxT/S Control system boot for most popular AT/XT/PC hard disk controllers. Verify your AT and XT-compatible 40 controllers segments hard disk by volumes controls access with passwords, supports hard disk expansion \$80-\$130 + \$3 shpg. plus C/Tax.



GOLDEN BOW SYSTEMS
PO Box 3039
San Diego, CA 92103
619-296-9449

\$20,000 REWARD OFFER

Backs the CRYPTOR Encryption Package, paid if encrypted text file (comes with package) is broken. CRYPTOR secures text or data on disk or over modem. Works with all communications software. Non-DES proprietary algorithm. Optional output as telex codegroups. PC/IMS-DOS. \$39 pdd. or send for information. Numerical Records Software, Dept. PH. PO Box 243. Cambridge, MA 02238.

PASSWORD CONTROL YOUR PC'S

PC LOCK allows file by file password and encryption protection. With the lock in place, your computer will not boot without entering a correct PIN. Ideal for small multi-user environments. A 5" x 4" card with detsite, 16 changeable passwords. Three versions from \$149. DES optional. KEEP YOUR PC STRICTLY PERSONAL.



MPPI, LTD.
2200 Lehigh Rd.
Glenview, IL 60025
(312) 998-8401

SOFTWARE

SORT

OPT-TECH SORT/MERGE

Extremely fast Sort/Merge program for the IBM PC, XT/AT. Can sort or merge multiple files containing fixed or variable length records. Run as a DOS command or call as a subroutine, plus many other features. Now also sorts BTRIEVE and dBASE II files! Compare before you buy any other. Write or call for more info. \$99.

OPT-TECH DATA PROCESSING
PO Box 2167
Humble, TX 77347
(713) 454-7428

SOFTWARE

SPREADSHEETS

123/SYMPHONY USERS

Comprehensive, flexible application templates designed for the experienced or novice user.
• Business Package (22 Applications) \$49.95
• Business Accounting, Forecasting Tools, Dept. Schedules, Productivity Tools, Real Estate
• Personal Package (10 Applications) \$19.95
• Budgeting, Scheduling, Rental Property, Network, 30 Day Money Back Guarantee, Both. Price \$59.95.
WestPointe Software
733 River Drive
St. Louis, MO 63088
(314) 225-4226

BLUEBOOK

SOFTWARE STATISTICS

SIGSTAT

SIGSTAT includes over 30 programs of the BMD statistical series, plus many advanced new features. Mainframe capacity (up to 80 var) for univariate (e.g., ANOVA, regression), multivariate (e.g., canonical, factor) analyses, time-series, multilevel scaling, crossplots, plots, Q/C and more. 8087 support opt. 256K DOS, \$595. SIGNIFICANT STATISTICS
3336 N. Canyon Road
Provo, UT 84604
(801) 377-4860

NWA STATPAK

Powerful data manipulation utilities. ASCII data structure for interface to databases, word processors, etc. Statistical functions include: probability, descriptive statistics, regression and correlation, non-parametrics, distribution functions, means testing, survey data analysis, & ANOVA \$495.
NORTHWEST ANALYTICAL, INC.
520 NW Davis St.
Portland, OR 97209
(503) 224-7727

RATS Statistical Package

RATS brings powerful and inexpensive statistical and econometric computing to the PC. It is a fast, accurate package that performs regression analysis, time-series forecasting, including Box-Jenkins, and cross-section analysis, including logit and probit. RATS can read data in many forms, including Lotus WKS files. RATS also offers programming features that provide maximum flexibility and power. Spectral analysis and graphics are available as options. Requires 256-K RAM, IBM or compatible. Base program \$200. Demo including 300-page manual, \$40. MCA, VISA.

VAR Econometrics
134 Prospect Ave. S.
Minneapolis, MN 55419
(612) 822-9690

STATPLAN II

Statistical software. Easy to use, menu driven, full screen data entry and editing, complete graphics displays, cross tabs, ANOVA, multiple regression, curve fitting, exponential smoothing, seasonality interfaces with Lotus 1-2-3, dBase II, II and ASCII files. Only \$99.
THE FUTURES GROUP
76 Eastern Blvd.
Glastonbury, CT 06033
(203) 633-3597

THE SURVEY SYSTEM

An easy to use, menu driven system for the entry, editing, processing and presentation of questionnaire data. The system can produce cross tabs and scores in banner format, statistic and bar charts. Tables and charts are camera-ready for professional presentation. Card ready and open-end coding/analysis options available.
CREATIVE RESEARCH SYSTEMS
1649 Del Oro Blvd. P.
Petaluma, CA 94952
(707) 765-1001

SOFTWARE STOCK ANALYSIS

INCREDIBLE BUY!

Manage your portfolio like a professional for just \$89.95! With NET WORTH you will receive capabilities and performance usually only found in systems costing hundreds of dollars more. Take advantage of our 30 day money back guarantee or let us send you our free brochure. (For the IBM PC/XT/AT and compatibles with 256K, 128K version available for \$59.95) *plus \$5.00 shipping and handling charge. Visa and MasterCard accepted.
Bullish Investment Software
PO Box 653
Mansfield, TX 76063
(817) 473-9249 (800) 433-3605

SOFTWARE TAXES

TAXTIME™ FOR 1-2-3™

IRS & State approved tax preparation and planning templates for use with Lotus 1-2-3. Highly integrated, flexible, fast, and easy to use. Far surpasses all other tax spreadsheets. Used by many CPAs. Individual 1940 (320K) \$95/\$45 Corporate 1120 (320K) \$195/\$75 Partnership 1065 (265K) \$195/\$75. Call 540 (259K) \$95/\$45 New 5 year planners plus states 1040 (320K) \$195/\$75 1120 (512K) \$295/\$95 Coming soon. Federal 1041 plus NY, NJ, IL, AZ. Call toll free for detailed catalog.
Austin Scientific Inc.
1259 E. Camino, Suite 260
Menlo Park, CA 94025
USA (800) 227-3900
CA (800) 632-2122

SOFTWARE TERMINAL EMULATION

BARR/HASP INTELLIGENT RJE WORKSTATION

Bundled hardware and software for IBM PC, XT and AT. Transmits data to host and receives output simultaneously. Emulates IBM 3277-2 and HASP on IBM 360/20. Line speed 1200 to 19200 Baud (56 KB on AT). Supports multiple high-speed printers beyond 2400 lpm (7000 lpm on AT). Features menu-driven, printer forms control, printer support, unattended operation, easy installation. \$699 complete.
BARR SYSTEMS, INC.
Suite M, 2630 NW 41st Street
Gainesville, FL 32606
(800)-BARR-SYS/(904) 371-3050

THE IMPERSONATOR

The most flexible terminal emulation program. User can modify one of the 12 emulations contained in the package: VT100, IBM 3101 & TV 950 or custom design additional ones with the built-in communications "language." Virtually unlimited asynchronous capability. For the IBM PC and compatibles. \$245 + s/h. MC/VISA/CCD + (800) 443-8980

DIRECT.AID

DIRECT AID INC.
PO Box 4420
Boulder, CO 80306
(303) 442-8080

TC-LINK

The TC-Link Cluster can be used on all IBM PCs or compatibles. 1, 3, or 5 station clusters from \$769. Features: Extended color Resident SNA, Application Interface, Hot Key, Full Gateway, Fast File Transfer, Multiple LUs. TC-3276 single user Emulator is only \$619. Over 5000 SNA & B-SYNC sold Worldwide.
TRISYSTEMS CORPORATION
74 Northeast Blvd.
Nashua, NH 03062
(603) 683-0556

MicroGate BSC EMULATION

Our MicroGate family offers complete BSC Emulation. MicroGate/MS provides both remote 3270 & RJE links. MicroGate is a program-matched BSC subsystem to COBOL, C, BASIC, etc. MicroGate 2780/3780 is now the standard to which other PC/RJE links are compared-almost with our unequalled customer support.
GATEWAY MICROSYSTEMS
9501 Capital of Texas Highway, Suite 105
Austin, TX 78759
512-345-7791

VT100 on PC, XT, AT,

ZSTEM- VT100 Smart Terminal Emulator. 132 columns by windowing—no add'l hardware. Double High/Double Wide Characters. Complete VT100 line graphics & Smooth scroll. Full keyboard support, MANDOS International Font Support, EGA Support. File transfers: ASCII, XMODEM, KERMIT. Rates to 38.4Kb. High throughput. \$150.00. Quarterly dealer discounts available. 30 day money back guarantee. MC/VISA accepted.



IGA SYSTEMS LTD.
#412-2150 W Broadway
Vancouver, BC, Canada V6K 4J1
Support (604) 732-7411 Tlx 04-352848 VCR
Toll Free Order Line (800) 663-8702

SOFTWARE TRAINING

THE AUTHOR PLUS COLOR™

THE AUTHOR PLUS COLOR is a new versatile, highly easy to use COLOR computer authoring system. THE AUTHOR PLUS COLOR includes:
• 16 colors for text and graphics
• 7 frame types
• 6 types of learner interaction
And much more. IBM PC/XT/AT contact us.
RAPTOR SYSTEMS, INC.
324 South Main St.
Stillwater, MN 55082
(612) 430-2965

SOFTWARE TYPESETTING

HIGH-TECH TYPESETTING

Transmit your text via tel-line into directly to our fully automated typesetting system. \$2 per K characters with a \$5 minimum. Same day service. 200 typesetters in sizes up to 72 point. Send \$15 + \$3 shipping for our 220 page guidebook or call toll free and use your MC/VISA or AMEX.
INTERGRAPHICS INC.
106A South Columbia Street
Alexandria, VA 22314
(800) 368-3342 or (703) 683-9414 in DC area

SOFTWARE UTILITIES

PADLOCK/PADLOCK II DISKS

PADLOCK furnishes the user with a method for providing protection against unauthorized duplication from DOS commands \$99. PADLOCK II disks come preformatted with program and serialization. PADLOCK II disks offer superior protection. Ask about our PRIVATE TALK product. All work with hard disk. EXE/COM files and all DOS versions. MC/VISA.
GLENDON ENGINEERING
3601 Ridge Ave.
Arlington Heights, IL 60004
(312) 392-2482

SCREEN MANAGEMENT SYSTEMS

SMS is simply the best utility available for designing, using and saving color/menochrome screens. GOSUS's are supplied in BASIC to input, output, and edit screen data fields. Loads of extra features. We have been in business 15 years, winning many awards for programming excellence. Price \$195, demo \$50. Manual \$10. VISA/MC PC/XT/PC, 164K/1 Disk.
DNA SYSTEMS, INC.
PO Box 1424
Saginaw, MI 48605
(517) 793-0165

COPY II PC

Copy II PC is the backup insurance you need to protect your computer investment. Copy II PC makes floppy backups of most protected software quickly & easily, and even allows several to be run from a hard disk without a floppy in A! (Call for current list.) For IBM PC, XT, AT, 256K & also available for Apple II, Mac, C64. \$39.95 + \$3 s/h VISA/MC check

Central Point Software

CENTRAL POINT SOFTWARE INC.
9700 SW Capitol Hwy., #1008
Portland, OR 97219
(503) 244-5782

PEEK'S N POKES... and more!

Thousands of programmers enhance their programs and save time with PEEK'S N POKES! The disk (56 programs) & manual show you how to access and modify system status, perform DOS & BIOS function calls from BASIC or Pascal, and much more for only \$30. Want more? A perfect companion package, THE INSIDE TRACK, gives you programs assembler-assisted speed plus control over the keyboard, memory, programs, etc. Disk (61 programs) & manual for just \$45. Shipping \$2.50 order MC/VISA for DATA BASE DECISIONS
14 Borne Lane
Atlanta, GA 30328
(404) 256-3660 (800) 722-7006

FAST, SMART XT BACKUP

BAKUP™ does daily backups in less than 5 min, a full (10MB) backup in less than 30 min. Uses floppy disks, cartridge disks, etc. on XT, AT or compatible. Unique catalog of backed up files speeds restoration & prints backup reports. Includes 50 diskette labels & manual for money-back guarantee. \$179.95 Visa, M/C, PC or CDD

Bakup

SOFTWARE INTEGRATION INC.

For more info: 213-776-3404
To order: (800) 538-8157 Ext. 801 (USA)
(800) 672-3470 Ext. 801 (CA/IL)

TurboPower Utilities

Nine Powerful Tools for Turbo Pascal users on PC/XT/AT & compatibles—Pretty Printer, Structure Analyzer, Execution Timer & Profiler, Pattern Replacer, File Differencer, Command Repeater & more. See ads in Byte & PC Tech for more info. OS/2 disk & 130 pg. manual. \$55. With source code & theory. \$95.
TurboPower Software
478 W. Hamilton Ave., #196
Camarillo, CA 93608
(800) 538-8157, #830 (CA) (800) 672-3470

EASY AIM—30 day trial

Install your programs on a hard disk and creates subdirectories, paths, and displays programs in a menu, all automatically. Features include time log, backup to floppy or tape, copy files to/from floppies to/from between menu selected directories. DOS is transparent to end user. Powerful yet simple. \$84.95
LARSON SYSTEMS, INC.
BOX 193
STORY CITY, IOWA 50248
(515) 733-2717

DOS Path Command for Data

Now Lotus, d-Base, WordStar etc. can access data files no matter where they're located on your hard disk, floppies, or RAM disk. D-Path lets you organize your directories conveniently for you, not just your programs. Requires only 4K. Works on MS-DOS 2.0, 3.0 \$25 - \$25/h
Visa, M/C, company C/P, check
PERSONAL BUSINESS SOLUTIONS INC.
PO BOX 757 DEPT B
Frederick, MD 21701
301-865-3376

MENUS—MENUS—MENUS—MENUS

Initiate your users from the complexities of DOS. Create menus with any editor or word processor. Total control of selections, descriptions, and resulting commands. Can return to menu after program runs. Supports color. We're fighting piracy with quality software at reasonable prices. \$15 - \$2.50/h
MIDWEST SOFTWARE LABORATORY
PO Box 1218
Addison, IL 60101

UNIVERSAL CROSS REFERENCE

One Cross Reference does it all for BASIC, C, Pascal, FORTRAN, Modula2, COBOL, OBASE-II, Macro Assembler, etc. User-defined file titles, page numbers, file date/time. Unlimited symbol length—adjustable outer margins, compressed print. Multiple input files. Full directory and path support. DOS 2.x, IBM PC/XT, 286, \$39.95
DALSOFT Engineering
3565 High Vista
Dallas, Texas 75234

\$50 per Megabyte for IBM/XT

MCFORMAT software adds 15% to 50% to hard disk capacity by allocating space in smaller units than PC-DOS, thus wasting less space. PC/XT users get at least one Mib (3Mib hard disk users get up to 10Mib) more useful storage with fully compatible PC-DOS 3.0 or 3.1. \$50 prepaid including shipping. VISA/MC
Microcomputer Concepts, Inc.
9715 S.E. 43rd Street
Meriden, IA 56040
(800) 722-8088

FANSI-CONSOLE™

INTEGRATED CONSOLE UTILITY speeds up screen, scroll refresh, more. Hyperhead: auto disable screen, no scroll. IBM PC/XT/AT, more. X3.64 (all ANSI, SYS, VT, 100/52 keys, windows, keyboard breakups & macros. Recently revised in LOTUS™ June 85 pg. 8. Shareware disk \$25, or disk & 325 pg. manual \$50 (M/C or 4th) MC/Visa
Hershey Micro Consulting, Inc.
Box 8276
Ann Arbor, MI 48107
313-994-3259

COPYWRITE

CopyWrite backs up hundreds of the most popular copy-protected programs for the IBM PC. CopyWrite is revised monthly to keep up with the latest in copy protection, and comes with a trade-in offer. It needs an IBM AT, XT or PC, 128K & one disk drive, but can use more memory or another disk drive. \$50 US. Check/Credit Cards
QUADRO SOFTWARE LIMITED
45 Charles Street E., 3rd Floor
Toronto, Ontario, CA M4Y 1S2
(416) 961-6243

MEDIA MASTER PLUS

Read, write, and format over 60-CP/M disks and run most CP/M-80 programmed on the IBM-PC. Two program packages include ZPIEM, and C/P. M80 simulator program that transforms your IBM-PC into a 1-2Mhz CP/M 2.2 computer. \$59.95 + \$3 s/h (CA residents add 6% tax)
Intersecting Concepts, Inc.
4573-Highgreen Court
Moore Park, CA 93021
(805) 529-5073

AT/XT/PC HARD DISK EXPANSION

Replace hard disk with a bigger one, or add a second drive. Venture supports high-capacity drives on standard AT, XT, and compatible hard disk controllers. Includes multiple volumes, security features, selectable duties, keyboard lock. \$80-\$120 - \$3 shipping & CA tax



GOLDEN BOW SYSTEMS

PO BOX 3039
SAN DIEGO, CA 92103
619/296-9349

LABLMAKR. PC

This worksheet program prints highly visible, extra large "jumbo" as well as standard type. For labels, tags, tabs, notices, ferts, etc. 26 standard label formats allow many more variations, even on non-standard size forms. MS-DOS systems and most dot-matrix printers. Request brochure or no-risk order. \$49.00
ETS Center
Box 651, 35026-A South Turle
Wilmington, OH 44094
216/946-6479

SCROLL AND RECALL

A resident screen and keyboard enhancement utility. It captures the data that goes off the top of your display screen and allows you to scroll back through it. This can save or save it to a disk file. Also saves your DOS commands as you enter them and allows you to recall edit and re-enter previous commands without retyping. \$69
DPT-TECH DATA PROCESSING
PO BOX 2167
HUMBLE, TX 77347
(713) 454-7428

HP LaserJet Setup Utility

STEP: A simple menu-driven and for batch utility that allows full control over your HP LaserJet printer. Supports 7 font cartridges. Control margins, number of copies, lines per inch, lines per page, etc. Over 125 commands. Only \$49.95 + \$4.50 CHECK/VISA/MC. Illinois residents add \$3.12 sales tax



ORBIT ENTERPRISES INC.

PO Box 2875-M
Glen Ellyn, IL 60138
(312) 469-3405

DIGICOM PRINT PACKAGE

Want SIDEWAYS printing for SPREADSHEETS? How about BANNER, PAMPHLET, LETTER, and BOOKLET printing too? Variety of fonts. Graphics characters. Character editor to MAKE YOUR OWN FONTS or SYMBOLS? Quick printer setup program too. Easy menus, online help. IBM/Epson printers. DOS, 128K. \$49.95 (PR-6th)
DIGITAL CONCEPTS, INC.
PO Box 8345, Dept 8
Pittsburgh, PA 15218
(412) 821-8314

MENU SYSTEM MANAGER

Professional system management via USER CREATED MENUS. Invoke any DOS command or program filename (EXE COM BAT) with PASSWORD SECURITY AUTOMATIC LOG for any menu entry stores Date, Time, User Id, Command invoked, Purpose of Access. Menus contain no commercial information, (makes YOU look good). \$129.00 M/C, VISA, CH. GURDAR Software Development
158-B Marlene Ave.
West Paterson, NJ 07624
(201) 785-2496

COMPUTER SYSTEM LOG

Monitor activities on your computer with SYSLOG. The SystemLog Utility is a command driven nonresident DOS extension that allows automatic task recording. With SYSLOG, all of your computer time is noted, saved, and categorized. Reports printed for tax purposes or for monitoring PC usage. Only \$34.95 + \$h VISA/MC accepted

SYSLOG

Apex Reston, Inc.
23 Christine Court
Storrmville, NY 12562-9612
914-221-2261

IBM TOSHIBA INTERFACE

Complete interface between IBM PC/XT/AT/JR and TOSHIBA HIGH QUALITY PRINTERS. Use full potential of Toshibas for word proc., spreadsheets, data bases and business graphics. Includes printer driver, 304-line extended character design prog, graphics driver, patch & hard-dump capability. \$69 PC min, \$79.95 VISA/MC INTEGRATED DATA TECHNOLOGIES 4775 Bunchberry Lane Colorado Springs, CO 80917 (303) 486-2583

Hard Disk DIRECT ACCESS™

The ULTIMATE utility for any hard disk user. DIRECT ACCESS is a powerful hard disk management tool. Organizes your software programs into a "user defined" menu system. Features attractive screen display, rapid access into an application using a single keystroke & easy to learn. Also handles batch files & complicated DOS commands. Order today! Only \$39.95 - \$5.00 shipping. MC/VISA



DELTA TECHNOLOGY

DELTA TECHNOLOGY INTERNATIONAL, INC.
PO Box 1154
Edu Claire, WI 53072
(715) 832-0958

dWINDOW™

is an 9K assembly language program adding 25 NEW WINDOWING SYNTAX statements to dBASE II

- User defined in-memory and disk-based, tree-structured WINDOW files
- Executable DOS command at prompt
- CAPTURE full/part screen
- Create Menus with READ BAR capability
- Character Graphics
- Fully compatible with dBase II .PRG files
- Spec. (IBM-PC, XT or AT) to dBase II vs. 2.4 or 2.41

\$165.00 (\$4.00 shipping) check, MC or Visa

LIBERTY BELL SOFTWARE

LIBERTY BELL PUBLISHING
PO Box 69306 Dept. A
Portland, Oregon 97201
(503) 221-1806

UTILIZE THIS SPACE!

Consult PC Blue Book every issue for easy reference to services/hardware/software. You can be part of PC Blue Book for 4 issues for only \$800. You get 7 lines of copy, PLUS a boldface heading, PLUS 4 lines for your name, address, and phone number. Logo art \$500 additional. Reach out to the largest market of IBM PC owners and users. YOUR Call/telex/Concordia/under collect today!
PC BLUE BOOK
1 Park Avenue
New York, NY 10016
(212) 503-5115 collect.

SOFTWARE WORD PROCESSING

PC-WRITE™

Features: wordwrap, search/replace, justify, block move/copy/delete, headers/footers, etc. Help screen, quick ref. card, 100 page manual. Split screen, edit two files at once. Disk with software and manual \$10, registration with support, source, and commissions \$75. Software can copy and share with others. VISA/MC. QUICKSOFT 219 First North #224C Seattle, WA 98109 (206) 282-0452

MY WORD IS JUST \$35

Emulates w. Full-featured, full screen word processor for IBM PC/XT/AT/JR or compatibles. Wordwrap, search/replace, block ops, headers & footers, sort, auto row/column, calculator, macros, merge-print, quick print, 256 CHARS. Allows color & customerizing 100+ ops, won't lose text, utilities, translate w. files to ASCII or back. Help screen, printed manual (index/table of contents), fully supported. Source: add \$35 DOS 1.1-3.0, 128K. I drive: use any printer, 30 day money-back guarantee!

TW 1 SOFTWARE INC.
34069 Horseshoe Road
Round Lake, IL 60073
(312) 223-0832

WP & PC MEDIA CONVERSIONS

The oldest media conversion bureau and translator manufacturer in the nation! We build the devices most others use for their conversions. We convert all major WP's (IBM PC's 9-tracks, etc.) While maintaining easy edit ability. Guaranteed best price and turnaround! Systems Compatibility Corporation 410 N. Michigan Ave Chicago, IL 60611 (312) 329-0700 or (800) WP-CODES

PC BUYERS GUIDE

THE INDEPENDENT GUIDE TO PRODUCTS AND SERVICES FOR IBM Personal Computers. This master directory lists, describes, rates for ease of use, and tells you about the latest in software, hardware, accessories, supplies, books, services, etc. All Everything for you and your IBM PC! It even includes an Index of Computer Camps for both adults and children. From the publishers of PC. An ideal gift at only \$7.95 (+ \$1.55 shipping/handling) to U.S. destinations, and \$11.00 elsewhere. Residents of CA, CO, CT, DC, FL, IL, MA, MD, NJ, and NY add applicable sales tax. Checks or MasterCard or VISA acceptable (with number, expiration date and signature). U.S. funds only. Mail to PC BUYERS GUIDE CN 1914 Morristown, NJ 07960

DON'T BELIEVE US!

Listen to what actual users are saying about new Pop-Up™ DeskSet™ and DeskSet Plus!

"Much better than competition. (Know anyone who wants to buy a Sidekick? \$25)." — Ivan Myers, Cummins Engine Co.

"This is an excellent package (Thanks)" — James Bonardant, ComputerLand Corporate

THE CRITICS AGREE:

"DeskSet has taken the Sidekick idea a step further." InfoWorld, 1/14/85, "Product of the Year"

New Pop-Up DeskSet includes Standard and Financial Calculators, Pop-Up Anything, PopDOS, Clipboard, Notepad, Calendar, Alarm

Clock and Pop-Up Voice. \$69.95.

New Pop-Up DeskSet Plus includes all the above plus Pop-Up TeleComm, a telecommunications software program. \$129.95.

But don't believe us, see for yourself! You'll find DeskSet and DeskSet Plus at leading software dealers, or for a limited time you may order direct from Popular Programs. Call toll-free and charge your Visa, MasterCard or American Express. 1-800-64-POP-UP (1-800-447-6787)

formerly Bellsoft, Inc.

POPULAR PROGRAMS, INC.

2820 Northway Way
Bellevue, WA 98004
(206) 628-7282



System requirements: IBM PC, XT, AT, 320 PC, PCjr or compatible. Phone dialer and telecommunications require a PCjr or XT and a Hayes compatible modem.

Pop-Up, Pop-Up, DeskSet are trademarks of Popular Programs, Inc. Sidekick is a trademark of Borland International.

CIRCLE 112 ON READER SERVICE CARD

SCIENTIFIC POP-UP CALCULATOR

Now you can have all the power of the HP-11C plus more, right on your PC! INTRODUCING THE KSH-1 FULL FUNCTION POP-UP CALCULATOR

The KSH-1 is:

- 20 to 130 times faster than the handheld. (8087 Version).
- Able to insert results directly into foreground program.
- Graphically presented on screen.
- Able to save/recall programs to disks.
- Operable in hex, binary, octal and decimal modes.

•• Plus many other features!••

4995 either plain or 8087 version
5995 both versions

Add \$3 s/h, Visa, MC, Check, MO
Tenn. add 7.25% sales tax.



K SOFTWARE HOUSE
Rt. 2 Box 8381
Unionville, TN 37180
(615) 294-5090

CIRCLE 343 ON READER SERVICE CARD

Explaining the Inexplicable

The Cognitive Computer and The AI Business delve into the artificial intelligence research arena and predict the future developments of this elusive science. Eventually, computers may learn from the data they store.

What do you know about artificial intelligence (AI)? What does anyone know about it? Not much, say most researchers. Before developers can create computer programs with the ability to think and learn from experience, they must understand how this is accomplished by human intelligence and be able to model it.

A lot of people have been talking about AI lately, perhaps because of the recent emergence of commercially available expert systems software. But expert systems are only the first step in a field that is still in its infancy, and it is important to understand how they relate to the long road ahead. *The Cognitive Computer*, by Roger C. Schank with Peter G. Childers, and *The AI Business*, edited by Patrick H. Winston and Karen A. Prendergast, are two new and very different books that will give you an eye-opening look at artificial intelligence.

The Cognitive Computer

Schank is no newcomer to computers and artificial intelligence. He is chair-



The Cognitive Computer

Roger C. Schank
with Peter G. Childers
Addison-Wesley Publishing Co., Inc.
Reading, MA 01867
(617) 944-3700

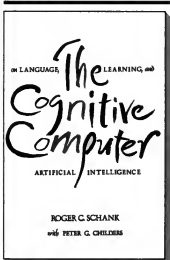
Copyright: 1984

Cover Price: \$17.95

ISBN: 0-201-06443-X

CIRCLE 660 ON READER SERVICE CARD

man of Yale University's computer science department and director of the Yale Artificial Intelligence Project. He is also chairman of Cognitive Systems, a company that designs and sells computer programs. Over the years, Schank has earned a reputation as the "bad boy" of



AI, but he is an intriguing thinker and a brilliant scientist, all of which translates very nicely into a well-written book.

The Cognitive Computer is a what-you-always-wanted-to-know-about-AI book rather than a technical, scientific treatise on the subject. Schank makes you well aware of the current and future role of AI in the computer revolution (or

evolution, as he calls it), and his message is quite basic: it is difficult for people to use computers efficiently because today's computers know nothing about the data they store and can learn nothing from it. The thrust of the author's work in AI has been in the area of natural-language processing.

Schank and his colleagues in AI research develop computer programs based on their belief that it is software, not hardware, that can be endowed with artificial intelligence. Their goal is not to develop better electronics but to develop a better understanding of the human mind. Thus, the first third of *The Cognitive Computer* develops the premise that artificial intelligence "is an intrinsically human subject" and has more to do with studying people than with studying computers.

Revealing Failures

Schank freely admits to being a long way from a solution but insists, in the same breath, that each failure is what defines the next step in this elusive science. To define what is intelligent, you must first define what is not, and Schank does this in a most entertaining fashion by relating some of his work on natural-language processing done at the Yale artificial intelligence lab.

For example, a Yale graduate student created a program called TALE-SPIN that wrote children's stories. TALE-SPIN was an effort to model the human planning process and much was learned, though many laughs must have been had as conceptual bugs were uncovered. At

BOOK REVIEW

one point, a TALE-SPIN story read: "One day Joe Bear was hungry. He asked his friend Irving Bird where to find some honey. Irving told him there was a beehive in the oak tree. Joe threatened to hit Irving if he didn't tell him where to find some honey."

This story illustrates the most frustrating and difficult aspect of AI work: making the computer understand what it is doing. The way the student wrote the program, the computer thought that Irving's statement about the beehive was a refusal to help. The bug was fixed by giving the program more information about beehives. Now, the story makes sense: "One day Joe Bear was hungry. He asked his friend Irving Bird where to find some honey. Irving told him there was a beehive in the oak tree. Joe walked to the oak tree. He ate the beehive." Schank discusses lots of different programs and their problems in section 2.

The last section of the book theoretically deals with what Schank believes AI holds for people in the near, middle, and distant future. He predicts that researchers will develop narrowly focused advisory systems for fields such as medicine, law, and finance in the next 2 to 3 years. Ten to 15 years down the road, he writes, you can expect networks of learning systems dealing with a wide range of subjects. And 50 years from now, perhaps, world knowledge systems will be able to learn and teach any discipline.

The Cognitive Computer has a lot to offer the inquisitive reader, in terms of both solid information and speculation. It is a delight to read and leaves you full of hope for the future of computers and humans.

The AI Business

If you are not interested in what will be happening in 10 to 50 years but want to

explore the commercial viability of artificial intelligence, *The AI Business* will satisfy your appetite for such knowledge. By presenting a collection of the widest range of views available, the book disproves the old adage that too many cooks spoil the broth.

The AI Business is as much a tour de force of AI history as it is a glutinous supply of food for thought, served up by 16 of the most influential personalities in artificial intelligence research as it relates to computer systems. It was written by them, too—not originally as text for a book but as speeches for a symposium on artificial intelligence as a commercial enterprise.

The AI Business, subtitled *The Commercial Uses of Artificial Intelligence*, is organized into four sections: Expert Systems, Work and Play, Robotics, and Today and Tomorrow.

The first section examines in great de-

PROJECT MANAGEMENT CONTROL



PMS-II® MEANS BUSINESS

For the serious user who wants to maximize productivity, PMS-II is the project management answer — a complete critical path network analyzer and scheduling package that can be expanded with resource and materials management — and near plotter quality graphics.

- Menu driven — easy new documentation
- Many mainframe features
- Unrestricted project size
- Extensive reporting capabilities

- Runs on most micros with: PC-DOS, MS-DOS, CP/M-86

Project management technology is our only business. Send for our newsletter and free literature.

PMS-II retails for \$1295, demo diskette for \$50



5230 Carroll Canyon Road, Suite 110
San Diego, California 92121
(619) 456-1327 Telex 701257

IF YOU SUBSCRIBE TO



PLEASE READ THIS

... Take a moment now and remove your mailing label and save it with this message. Your label is very important and helps us to help you quickly!

- When moving, send us your label with your new address 8 weeks before you move to PC MAGAZINE, P.O. Box 2445, Boulder, Colorado 80322.
- If you have a question about your subscription, simply send us a note with your label, or a note with your name, address and Personal Identification Number to P.O. Box 2445, Boulder, Colorado 80322.

Your P.I.N.		Your Expiration Date	
802222		OCT 83	
Your Name		Affix label here	
Your Company			
Address			
City	State	Zip	

CIRCLE 161 ON READER SERVICE CARD

tail the development process of five expert systems, with each author attempting to illustrate by example what artificial intelligence is doing now. My favorite essay was from Alan Kay, former chief scientist and vice president of Atari. It didn't specifically concern his work at Xerox PARC, Apple, or Atari, his programming language SMALLTALK, or any single train of thought. Kay touched on everything, and he pulled no punches about his feelings for the Xerox executives who vetoed several of his projects. "Point of view is worth 80 IQ points," he says.

Three essays by J. Michael Brady of MIT, Philippe Villers of Automatrix, and Paul Russo of General Electric make up the section on robotics. I didn't find this section as interesting as the other because the thrust of the essays was factory automation and the problems associated with systems that provide vision, muscular activity, and dexterity. I would have been more interested in hearing about robots that do household chores.

Section four begins with a marvelous essay, "The Problems and the Promise," by Marvin Minsky of MIT. Minsky is one of the pioneers and current leaders in artificial intelligence research, and his message, while downbeat, was put forth with stunning candor. He is upset that little is being done these days in the way of new research, that the AI community in this country may not be pushing as hard as researchers in Japan, and that big companies don't fund more research.

Other contributors' thoughts were also inspirational. At the end of each section, the editors did a nice job of interviewing the contributors about key points and

digging for further clarification.

The AI Business is a collection of essays that impressively defines the state of the art in commercial AI programs and offers an inside look at how many of

them were developed. Its multiple personality is its best feature. ■

Phil Wiswell is a regular contributor to PC Magazine.

Printer Boss™

GOOD GRIEF, IT DOES EVERYTHING!

The all-new Printer Boss uses machine-level source code to give you superfast operation, command-line input option, dazzling font design features and much, much more. Now you can take full advantage of the capabilities you paid for in your dot-matrix printer, on one plain-English menu, at the touch of a few keys. And everything can be controlled from an AUTOEXEC.BAT file! No other program gives you all these features.

Custom font design

- Draft mode 8x11 dots/char
- Quiet density 16x24 dots/char
- LO-1500 24x9 dots/char
- LO-1500 24x29 dots/char
- LO-1500 24x37 dots/char
- Graphics mode screen display
- Single-key current character test print
- Custom font loading from menu
- Unlimited custom font library

Choice of character sets

- IBM Matrix character set
- IBM Graphics 1 character set
- IBM Graphics 2 character set
- IBM Screen character set
- IBM APL set
- Graphics characters link vertically
- Simulated download, MX, RX, etc.

Supports pathnames

- Configuration, font and print files

Printer format control

- Elite compressed, enhanced, etc.
- Line spacing
- Right & left margin
- Set form length lines & inches
- Set unidirectional printing
- Set half-speed & proportional printing
- Select 8 Epson language sets

Letter quality graphics printing

- Double density graphics
- Quad density graphics

RAM printer buffer up to 32K

- Buffer on/off control
- Print current buffer control
- Abort current buffer control

Command line printer control

- Autotelex bat file operation
- Unlimited stored settings recall

Unlimited menu setting storage

- Single-key reset to default settings
- Configuration file settings storage

Sideways printing

- Menu selection of 6 font sizes
- Full 256-character fonts
- Sideways font design
- One-piece "glued" spreadsheet output
- Character & line spacing control
- Left margin control
- Top & bottom margin control
- Paper width choice: 8" or 15"
- Doublestrike option
- Printer selection from menu
- Menu printer port selection
- Commands independent of Lotus version
- Spreadsheet page setting constant
- Requires input of 8 or 16 rows ONLY
- Avoids user calculation of "gutters"

Special features

- Typewriter output mode
- Printer setup string feature
- Custom logo design
- Pop-up printer control features
- Print direct from word processor
- Supports function keys
- Master select code feature
- Enable Epson NLD option
- Directory default change from menu
- Drive default change from menu
- Indicates unavailable options
- Single-key sample print routine
- Printer selection from menu
- Mouse software interface
- Help screens
- Single menu, all features

For the IBM PC, PCjr, XT, AT and all compatibles with 128K RAM and one double-sided drive using PC-DOS 2.0, 2.1, 3.0 or equivalent. For the Epson and IBM dot-matrix printers and all compatibles. Printer Boss protected \$139.95, unprotected \$169.95. VISA, MC or send money order or check. Company purchase orders accepted. Shipping \$4.00 per package. C.O.D. add \$2.00. Outside USA, \$15.00. Dealers welcome. Free info.

CONNECTICUT SOFTWARE SYSTEMS
30 WILSON AVENUE
ROWAYTON, CT 06865

INFORMATION

203-838-1844

ORDERS

800-321-0409



Connecticut Software

PC FACT FILE

The AI Business

Edited by Patrick H. Winston and Karen A. Prendergast
The MIT Press
28 Carleton St.
Cambridge, MA 02142
(617) 253-5646

Copyright: 1984

Cover Price: \$15.95

ISBN 0-262-23117-4

CIRCLE 659 ON READER SERVICE CARD

CIRCLE 175 ON READER SERVICE CARD

PC: Mart

ICs PROMPT DELIVERY!!! SAME DAY SHIPPING (USUALLY)

OUTSIDE OKLAHOMA NO SALES TAX

8087-3	MATH	\$125.00
8087-2	COPROCESSORS	150.00
DYNAMIC RAM		
256K	256Kx1	120 ns \$ 3.95
256K	256Kx1	150 ns 2.95
64K	64Kx1	150 ns 1.10
EPROM		
27C256	32Kx8	250 ns \$17.50
27256	32Kx8	250 ns 8.50
27128	16Kx8	250 ns 3.30
27C54	8Kx8	200 ns 5.25
2764	8Kx8	250 ns 2.95
2732A	4Kx8	250 ns 2.75

STATIC RAM

6264LP-15	8Kx8	150 ns	\$4.75
6116LP-3	2Kx8	150 ns	1.95

OPEN 9:00AM - 5:00PM MON-FRI 9:00AM - 12:00PM SAT

MEMPHIS, TN 38104

Factory New, Prime Parts, Jiffy Run

MICROPROCESSORS UNITS

26,000 S. Poplar Ave. (918) 287-4961

80052 OK 74421

Prices shown exclude any tax except in TN

Please call for current prices. Prices subject to change. Please contact (918) 287-4961 for more information. We reserve the right to change prices without notice. Payment by check or money order is required. Delivery is guaranteed in 1-2 weeks. For orders or information go to the following website: <http://www.pc-mart.com>

Copyright © 1988 PC: Mart. All rights reserved. PC: Mart is a registered trademark of PC: Mart.

64K • 128K • 256K

DRAMS

80287-3

8087-3

8087-2

BITTNER



ELECTRONICS

899 SOUTH COAST HIGHWAY
LAGUNA BEACH, CA 92651
(714) 497-6200

CIRCLE 14 ON READER SERVICE CARD

FANTASTIC PRICE! NASHUA DISKETTES

FIVE YEAR WARRANTY

75¢ each
Qty. 100

5 1/4", 55/00 or 66/00, your choice, with hub ring and T-yak sleeve, bulk packaged, no labels. Shipping extra. For quantity 50, add 10¢ each.

Get the same low price our high-volume duplication customers get!

**CALL TOLL FREE
1-800-321-4668**

In Colorado, 303-234-0871

ALF Products Inc. - Denver, CO

PC BUYERS GUIDE

THE MASTER DIRECTORY
OF PRODUCTS FOR THE
IBM PC, PC XT, PCjr
AND MOST COMPATIBLES!

AVAILABLE AT YOUR
LOCAL NEWSSTAND AND
COMPUTER STORE

DEMOGRAPHIC DATABASE

- IBM PC COMPATIBLE
- 3189 U.S. COUNTIES
- 957 LARGEST CITIES
- ON 32 DISKETTES

* INCLUDES DATA ON:

agriculture, banking, crime, education, government, health, household labor force, land, manufacturers, personal income, population, poverty, retail trade, service industries, social security, weather... and much more.

* USED FOR MARKET AND SALES RESEARCH, INDUSTRY SURVEYS, CENSUS RESEARCH, ETC.

* \$290.00 VISA & MASTER CHARGE

CALL TODAY!!

(714) 650-1000

MELISSA DATA CO.
12 BALBOA COVES
NEWPORT BEACH, CA 92662

CIRCLE 10 ON READER SERVICE CARD

IBM PC 256K, 2 Drives, Monitor & Monitor adapter card \$1799.00

WCI-XT (IBM™ PC-XT Compatible Computer) 64K, 130 watt power supply & keyboard \$549.00

WCI-XT 256K, 2 Drives, Monitor & Adapter Card \$995.00

64K RAM CHIPS \$.89

MULTIFUNCTION CARD.
6 Functions, 384K Fully Loaded \$199.00

WCI PRINTER DRIVES
REPAIRS
AVAILABLE FOR IBM PC
AND COMPATIBLES

Call
WESTLAND COMPUTERS, INC.

2110 E. First St. Suite 105 Santa Ana, CA 92705

(714) 953-5411

Telex: 5101011638

*IBM PC XT is a registered trademark of IBM Corp.

CIRCLE 11 ON READER SERVICE CARD

REPRINTS AVAILABLE

Quantity reprints of articles appearing in PC Magazine are available and will be prepared to meet any special requirements. Inquiries should be directed to Eileen Pfeiffer, Reprints Dept., Ziff Davis Publishing Co., 1 Park Ave., New York, New York 10016. Phone 212-503-5447.



PC EXPANSIONS

AST SixPakPlus (64k)	\$259
SixPakPlus (384k)	\$299
MegaPlus (64k)	\$269
Advantage (128k)	\$419
Advantage (1.5M)	\$679
I/O Plus	\$129
PCnet - starter kit	\$809
Quadboard (64k)	\$159
Quadboard (384k)	\$249
Quadmeg AT (128k)	\$319
Quadmeg AT (2M)	\$669
QuadPort AT	\$105
HERCULES graphics board	\$319
Color Card with HP	\$159
HAYES Modems 2400	\$649
Smartmodem 1200	\$409
Smartmodem 1200B	\$379
Set of 9 chips (64k)	\$10
256k chips (each)	\$5
6007 chip	\$119
Maynard Disk Controller	\$100
Sendster Series	\$249
Internal Hard Disks from Maynard	\$679
Streamtape backup from	\$979
Qume 142A	\$109
Teac FDS-5	\$109
Tandon TM100-2	\$109
CDC 9409	\$119
Verbatim Datalite disks (10)	\$25

VLM Computer Electronics
10 Park Place • Morristown, NJ 07960
(201) 267-3268 Visa MC Check or C.O.D.

CIRCLE 53 ON READER SERVICE CARD

TERMINAL EMULATION

Softerm PC emulates over 30 popular terminals including the:

- DEC VT102, VT220
- Data General D200, D410
- IBM 3101-20 (block mode)
- Hewlett-Packard 2622A
- Honeywell VIP7801, VIP7803

Guaranteed Compatibility

Call for free product brief

\$195 MC-VISA-CDD

For the IBM PC/XT/AT, DG1, NEC,

Wang PC, TI Pro, Gridcase, Tandy

SOFTRONICS

3639 New Getwell, Suite 10
Memphis, TN 38118
901-883-6850

CIRCLE 53 ON READER SERVICE CARD



GET FREE INFORMATION!

Of all the products advertised in this issue of PC Magazine, there are dozens you'd probably like to know more about. Handfuls you might be interested in buying.

Now you can have pertinent, comprehensive information about these products right at your fingertips, and it won't cost you anything. Only a minute of your time.

The manufacturers and distributors of these products have colorful and informative literature available. If you're interested in receiving these brochures, PC's Reader Service Program can help.

Simply follow the instructions described below and PC will forward your requests for information to the appropriate advertisers. Before you know it, you'll have a complete and handy product reference file.

While you are looking through PC Magazine take advantage of this handy flip-open card to

circle the numbers as you see products that interest you.

Getting free information about products advertised or mentioned in this issue of PC is as easy as 1-2-3.

1. Each ad in the magazine includes a reader service number. (These numbers are repeated on the advertiser index, as well.) If you'd like more information about the product or products described in a particular ad or feature, circle the corresponding number on the attached card.
2. Fill in your name and address in the space provided. Please: only one card per person.
3. Mail the card today... it's postage paid. And watch your information file begin to grow.

NOTE: This card is to be used for product information or subscriptions only. Editorial inquiries should be directed to PC Magazine, One Park Avenue, New York, NY 10016.

Now is also an ideal time to become a PC subscriber. See the back of this card for details about our special offer for new subscribers.



**IF YOU ARE A
PROFESSIONAL PC
USER...**

**IF YOU SEE THE
PC AS AN INVESTMENT
OR IMPORTANT
BUSINESS TOOL...**

**IF YOU WANT TO
MAXIMIZE YOUR PC
PRODUCTIVITY...**

**HERE IS A SPECIAL
OFFER YOU WON'T WANT
TO MISS!**

Now you can receive 24 biweekly issues of PC Magazine for only \$21.97—less than 92 cents an issue!

The money PC will help you save will cover the cost of your subscription more than ten times over!

How?

In PC Magazine, you'll find in-depth and thorough product reviews that will help you make informed and appropriate buying decisions.

You'll learn about innovative applications... project management, communications and graphics... and how to put them to use on your PC.

You'll hear industry news first-hand, and how forward-thinking professionals are using their PCs to further their business goals.

What's more, you get all this information every two weeks, giving you a decided edge over colleagues who rely on a monthly publication.

Your subscription to PC is your guarantee of the most up-to-date and comprehensive coverage of innovations and applications that will help you maximize the performance of your PC.

So don't miss out. Act now on PC's special offer and get 24 issues for only \$21.97. Fill out the attached reader service card and check the subscription box. Or, call toll free, 1-800-852-5200.





Coming Up

Price-Conscious Computing

In an office that buys hundreds of personal computers and thousands of software packages to go with them, a cost difference of a few dollars per unit can add up to quite a bundle. The next issue of *PC Magazine* takes an in-depth look at low-priced, high-quality products that are powerful enough to succeed in today's no-nonsense business environment. We review six IBM PC-compatible computers that sell for less than \$2,000, testing them for speed and compatibility and assessing their looks, feel, convenience, and manufacturer's support. We also evaluate some of the available business software priced under \$200 in four categories: word processors, spreadsheets, database management systems, and accounting packages. If you're looking for ways to cut your office automation costs without sacrificing the quality or features you need, look into the next issue of *PC Magazine*.

Special Report: Wang

Wang Laboratories' name has become synonymous with state-of-the-art office communications equipment. From micro to mini to mainframe, no other company—including IBM—has managed to integrate its office computing hardware as thoroughly as the personal computing and networking teams at Wang. However, despite the high quality and near-total integration of its products, the company has not been entirely successful in marketing and selling them. This special report will examine the Wang Professional Computer and Wang PC networking, as well as analyze this young and innovative computer giant's strategy and positioning in the highly competitive office technology market.

VS COBOL Workbench

The COBOL language has long been a mainstay of mainframe computing. Recently, it has undergone rapid growth in popularity as a programming option for the IBM PC. Why this sudden surge of popularity? One reason is COBOL's easy readability and comprehensive data management capabilities, which have made it the universal computer language of business. Another reason is the appearance of products which adapt COBOL to the PC environment, like the Micro Focus VS COBOL Workbench.

The ISM Express

If you're looking for terrific graphics capability in a transportable package, you may find it in the ISM Express, a PC-compatible portable computer that features the highest-quality components.

Formula IV Database

Dynamic Microprocessor Associates has made its bid for the business consumer by offering *Formula IV*, a sophisticated database management system and an easy-to-use applications generator in a single menu-driven package aimed specifically at the business user market. Can this program truly be all things to all businesspeople?

Insight 2 Expert System

Successful PC-based expert systems have been few and far between—until *Insight 2*, a new package from Level Five Research, came along. It is a fast and powerful tool, at an affordable price that may represent a new breed of PC expert system.

SHELF CONSCIOUS?

Now you can organize your copies of

PC MAGAZINE

Now your magazines can be a handsome addition to your decor, well organized, and easy to find, thanks to these durable library-quality cases or binders. They're made of luxury-lock leatherette over high-quality binder board. And both styles are custom-designed for this or any other magazine you save, with size, color and imprint selected by the publisher. FREE transfer foil included for marking dates and volumes.



Magazine binders

holds your issues on individual snap-in rods, combining them into one volume. \$7.95 each; 3 for \$22.50, 6 for \$42.50. Mixed titles OK for quantity prices.



Open-back cases

store your issue's for individual reference. \$6.95 each; 3 for \$19.75; 6 for \$37.50. Mixed titles OK for quantity prices.



OR CALL
1-212-503-5319

PC Magazine

P.O. Box 5120, Philadelphia, PA 19141

Please send ☐ Cases ☐ Binders

TITLE _____ QUANTITY _____

PC Magazine _____

Other _____

☐ PAYMENT ENCLOSED \$_____ Add \$1.00 per order for postage and handling. Outside USA add \$2.50 per unit ordered, send US funds only.

☐ CHARGE (Minimum \$10)
☐ American Express ☐ MasterCard
☐ Visa

Card No. _____ Exp. Date _____

Signature _____

Print Name _____

Address _____

City _____

State/Zip _____

*Residents of PA add 6% sales tax

PC Product Index

RS#	PRODUCT	ADVERTISER	PAGE#
ACCOUNTING SOFTWARE			
145	Accounting Software	Dac Software	17
260	Venus Business Series	H & E Computers	260
243	Accounting Software	RealWorld Software	48
168	Accounting Software	MCBS	210
169	RealWorld Software	RealWorld Software	5
170	Accounting for Managers	The James River Group	194
INTEGRATED ACCOUNTING PACKAGES			
476	Debit Accounting	SRT Corp.	21
COMMUNICATIONS SOFTWARE			
212	Remot	Microtel, Inc.	99
213	Remot	Microtel, Inc.	101
214	Remot	Microtel, Inc.	103
215	Remot	Microtel, Inc.	105
TERMINAL EMULATORS			
250	Triforce	FTD Data Systems	16
OTHER UTILITIES			
308	Utilities Software	Ease Software	188
314	Utilities Software	Prologix	99
FINANCIAL PLANNING SOFTWARE			
142	Brues Investment Software	Value Line Inc.	97
PORTFOLIO MANAGEMENT			
142	Brues Investment Software	Value Line Inc.	97
GRAPHICS SOFTWARE			
138	Monographs	Analytics International Inc.	234
115	Graphics Software	Regolith Systems & Co. Ltd.	131
134	Image Plus	Chives Data Systems	40
133	Imagecraft	Electronics Research Inc.	30
132	Imagecraft	Electronics Research Inc.	32
136	Graphics Software	Hypergraphics	68
112	PC Data	Microtel, Inc.	99
INFORMATION MANAGERS			
112	Pro-File	NetSoft	344
177	File Connection	Playgroup Engineering	154
178	KSHL Records Calculator	K Software House	244
PROJECT MANAGERS			
181	PM-11	North America Mfg. Inc.	340
187	Project Planner	Prologix	99
SOFTWARE FOR PROFESSIONALS			
143	Keywords	Alpha Software	13
149	Secretary	Arland International	173
125	Software for Professionals	Compu-Labware, Inc.	45
292	Keep Track	First Computer	46
130	Software	MicroSystems	223
131	Software	MicroSystems	28
ENGINEERS/SCIENTISTS			
231	NET Support	MicroWare	26
WORD PROCESSING SOFTWARE			
276	Displaywrite	IBM Entry Division	104-105
154	Word Perfect 4.0	SoftIce Software International (SSI)	52
176	WPS Write	Software Publishing	42
178	WPS Write	SoftIce	203
WORD PROCESSORS			
255	SoftWriter Deluxe	Lafayette Software	195
WORD PROCESSING AIDS			
102	Letter Plus	Baba Software, Inc.	188
133	PrintMerge	Polaris	182
222	Linkup	Systems Compatibility Corp.	196
223	Model Aid	Systems Compatibility Corp.	196
224	Word Link	Systems Compatibility Corp.	196
225	Text Cues	Systems Compatibility Corp.	196
226	Software Bridge	Systems Compatibility Corp.	196
MULTIFUNCTION SOFTWARE			
144	Public Domain Software	PC Software Interest Group	230
145	Maximus	Scans Design	89
INTEGRATED SOFTWARE			
196	Symphony	Lafayette Software	20-21
196	Integrated Software	Lafayette Software	73
145	Infidite	Lafayette Software	51
ENTERTAINMENT SOFTWARE			
334	PC Planetarium	Light Software	196
135	Am Studios	Spectrum Hobbyist, Inc.	142
LANGUAGES			
177	Quick Basic	Microsoft	177
178	C Compiler	Microsoft	178
COMPILED			
147	Parcel Family	Lotus International	171
148	Lotus C Compiler	Lotus, Inc.	170
PROGRAMMER'S TOOLS			
247	Quickman	Pen & Geller	67
113	Latex Topdown Tool Basket	Latex, Inc.	154
141	Programmer's Tools	PC Board	22-23
172	Screen Snapshot	PC Software	125
186	Starfield 3D	Starfield Technology	87
DATA BASE MANAGERS			
224	GP Tools - Office Mgr	Allen Harris Industries	90
218	Revelation	Comag, Inc.	80
225	PC Personal	GTE Telcel	9
226	PC Focus	Information Builders	63
227	Database Manager	Protime Pacific Engineering	4
228	PDS File Report	Software Publishing	42

RS#	PRODUCT	ADVERTISER	PAGE#
FORM DESIGNERS			
141	Form Tool	BLOC Development	36
PROGRAM DEVELOPER/GENERATOR TOOLS			
171	Flashcode	Software Building	157
222	ART Plus	STSC, Inc.	52
TEXT EDITORS			
182	SPICE	Commodore Technology Corporation	203
276	KEDIT	Manfield Software Group	182
196	Starfield 3D	Starfield Technology	87
OTHER UTILITIES			
152	Copy II PC	Contest Point Software	101
156	Pallick II	Genes Engineering	120
340	The Mechanic	MLI Microsystems	85
340	Norton Utilities	Norton Utilities, The	85
102	File Transfer	Personal Computer Products	185
196	CopyWare	Starfield Technology	87
HARDWARE			
284	Burles - 286 Mother Board	WaveWare	221
153	ATI-1000	Aerotech International, Inc.	148
153	ATI-2000	Aerotech International, Inc.	148
IBM PC COMPATIBLE COMPUTERS			
319	PC 86 & PC 286	Gulfstream Microsystems	78
249	PC 386	WaveWare	84
304	Burles 286 Mother Board	WaveWare	221
ACCESSORY CARD			
190	Jedes-Add-On	John Wiley	60
190	Number Separator	John Wiley	60
MULTIFUNCTION BOARD			
104	Sci Pak Plus	AST Research	12
378	Curator Board	Computer Peripherals	158
123	Multifunction Board	Compu-Labware, Inc.	45
381	Curator Edge	Curator Micro Inc.	210
VIDEOGRAPHICS BOARD			
102	Color Graphics	AST Research, Inc.	102
143	Hercules Graphics Card	Hercules Computer Technology	138
146	Hercules Color Card	Hercules Computer Technology	138
146	Modular Graphics Card	Pendulum Systems	57
EXPANSION UNITS			
163	Expansion Unit	Evans Systems, Inc.	9
163	Expansion Unit	MicroWare	26
INPUT DEVICES			
290	The Lash Pro	FTD Data Systems	16
140	SansaMouse	Summa Graphics	183
140	SansaMouse	Summa Graphics	183
INTERFACE DEVICES			
306	Starware PC System Barcode	Computer Industries	212
MASS STORAGE HARDWARE			
150	Disk Subsystems	CTA	103
225	AT Plus	Core International	187
381	Creative Edge	Creative Micro, Inc.	210
198	Mass Storage Disk	David Aldridge Co.	11
198	Hard Disk and Tape Back	Eveready Systems Corp.	18-19
182	Tape Backup and Hard Disk	Eveready Systems, Inc.	253-258
317	Meaglight	Kawerstein Labs	10
157	Transient	Maynard Electronics	39
293	Mass Hard Disk	Minimom Computer	128-129
156	Disk Drives	Signa Design, Inc.	86
386	QIC 60	Tecore	C-2
MODEMS			
213	Modem	Tetras	C-4
NETWORKING			
371	Multi-PC	Asea Technology	41
139	Net Network	Proton Inc.	29
139	Easy-Net	Server Technology	75
139	MultiLink Advanced	Software Link, Inc.	57
DISPLAYS/MONITORS			
113	Monitors	Compu-Labware	42
PLOTTERS, ETC.			
222	Colorwriter	Gould Inc.	144
PRINTER DRIVERS			
113	Printer Bus	Compu-Labware	247
DISKETTES			
123	Disks	Compu-Labware	45
214	Disk Drives	Compu-Labware	218
214	Mail Order Disks	Disk World	72
214	Disk World	Disk World	72
130	Mail Order Disks	Disk World	200
289	Disk Drives	Dyan	14
123	Flippy Disk	Manoff	14
123	3M Disks	Periscope Data Products	220
123	3M Disks	TED Electronics	72
ACCESSORIES			
197	Squash Surge Protection	Electronic Protection Devices	143
KEYBOARD OVERLAYS			
197	PC Decimate	System Management Associates	67
OTHER SUPPLIES - DISPOSABLE			
131	Disk Covers	Compu-Labware	85
LITERATURE			
190	Literature	NBI School of Electronics	66

Compuclassics

SOFTWARE

DATA BASE MANAGEMENT

ALPHA SOFTWARE Data Base Manager II	Our Price 170.00
ASHTON TATE dBase III	369.00
FOX & KELLER QuickCode III	145.00
QuickReport III	145.00
dGraph III	145.00
LEADING EDGE Nutshell	79.00
M.O.S.S. Knowledge Man	249.00
MICROPRO InfoStar +	109.00
MICROBRIM rBase 5000	359.00
Extended Report Writer	89.00
MICROSTUF InfoScope	125.00
NANTUCKET Clipper (dBase III Compiler)	429.00

WORD PROCESSORS

LEADING EDGE with Merge & Spell	149.00
LIFETREE Votewriter Deluxe	145.00
MICROPRO Wordstar	179.00
Wordstar Prolog	245.00
Wordstar 2000	295.00
Wordstar 2000 Plus	295.00
MICROSOFT Word	239.00
MULTIMATE Multimate	219.00
OVERON Oberon Omni-reader	639.00
SAMMA Samma Word III	245.00
Samma +	335.00
SATELLITE SOFTWARE Word Perfect 4.0	219.00

INTEGRATED SOFTWARE

ALPHA SOFTWARE Electric Desk	189.00
ASHTON TATE Framework	369.00
LOTUS Symphony	435.00
SOFTWARE GROUP Enable	339.00

SOFTWARE PUBLISHING

PS Family	89.00
Write	89.00
File	89.00
Graph	89.00
Access	89.00
Plan	89.00
Report	89.00
Proof	89.00
XANARO Ability	285.00

GRAPHICS

DECISION RESOURCES Chartmaster	239.00
Signmaster	175.00
DIGITAL RESEARCH Dr Draw	195.00
Gr Draw	89.00
I.M.S.I. PC Paintbrush w/ Mouse	129.00
MICROGRAFX PC Draw	245.00
MICROPRO Chartstar	145.00
MICROSOFT Chart	155.00

PROJECT MANAGEMENT

BREAKTHROUGH Timeline	225.00
HARVARD SOFTWARE Total Project Manager	245.00
MICROSOFT Project	159.00
SCITOR Project Scheduler 5000	269.00
SORCIM / IUS Superproject	229.00

SPREADSHEETS

LOTUS Lotus 1-2-3	309.00
MICROSOFT Multiplan	129.00
SORCIM / IUS Supercalc III Release 2	199.00

COMMUNICATIONS

HAYES Smartcom II	95.00
MICROSTUF Crosstalk XVI	99.00
Remote Transporter	145.00
WOOLF Move-it	89.00

ACCOUNTING

G.N.P. C.P.A. +	359.00
--------------------	--------

Order desk & technical support open:
8 a.m. to 6 p.m. Monday - Friday
10 a.m. to 2 p.m. Saturday

I.U.S.

All Modules	279.00
Payroll	329.00
Easy Plus	95.00
OPEN SYSTEMS All Modules	339.00
Business Basic Interpreter	185.00

REALWORLD

All Modules	399.00
-------------	--------

PROGRAMMING LANGUAGES

SORLAND INTERNATIONAL Turbo Pascal 3.0	35.00
With 8087	59.00
With 8087 & BCD	75.00
Turbo Toolbox	30.00
Turbo Tutor	15.00
Graphix Toolbox	30.00
DIGITAL RESEARCH C Basic Compiler	369.00
LIFEBOAT ASSOCIATES Lattice C Compiler	299.00
MICROSOFT Fortran Compiler	229.00
Pascal Compiler	199.00
Macro Assembler	89.00
C Compiler	249.00

UTILITIES

SORLAND INTERNATIONAL Sidekick	39.00
Sidekick (Unprotected)	45.00
Superkey	49.00
CENTRAL POINT Copy II PC	29.00
DIGITAL RESEARCH Gem Desktop	32.00
FUNK SOFTWARE Sideways	35.00
PETER NORTON Norton Utilities	55.00
QUADRO SOFTWARE Zero Disk	55.00
ROBOSOFT Prokey	99.00
SIMON & SCHUSTER Typing Tutor III	32.00

SOFTWARE ARTS TK Solver	259.00
UNISON Printmaster	32.00
WARNER SOFTWARE Desk Organizer	59.00

PERSONAL MANAGEMENT

CONTINENTAL SOFTWARE Home Accountant Plus	82.00
LIVING VIDEOTEXT ThinkTank	119.00
MECA Managing Your Money	105.00
MONODRAM Dollars And Sense	129.00

HARDWARE

MONITORS

AMDEK Amdex 310A	Our Price 159.00
PRINCETON GRAPHICS Max 12-E	189.00
HX-12	479.00
SR-12	599.00
Scan Doubler	179.00

PRINTERS

EPSON FX 80 Plus	309.00
FX 100 Plus	449.00
LQ 1500	915.00
NEC 2250	759.00
OKIDATA All Models	CALL
TOSHIBA 1340	679.00
351	1315.00

MEMORY AND MULTIFUNCTION BOARDS

AST RESEARCH Sisapack Plus w 64K	255.00
Advantage w 128K	399.00
Megapack II w 64K	295.00
GENOA SYSTEMS Spectrum	339.00
HERCULES Graphics Board	309.00
Color Card	145.00
PARADISE Modular Graphics Card	265.00
Five Pack with D K	159.00
QUADRAM Quadboard 64K	199.00

MODEMS

HAYES 1200 B	365.00
1200	389.00
2400	679.00

MISCELLANEOUS

KENSINGTON Masterpiece	89.00
KEYTHRONICS 5151 Keyboard	175.00
MICROSOFT Mouse	129.00

Call for prices on IBM computer systems and for any item not included in this price list.

1 818 705-1895 US
1 800 231-6603 CA
1 800 328-4473 US

ADVANTAGES

- We welcome corporate accounts.
- Free technical support.
- Immediate replacement of defective goods.
- Bulk discounts.

TERMS: All prices subject to change. No surcharge for VISA or MasterCard. 2% surcharge American Express. No returns without R.A.P. Short shipments must be notified with 48 hours. 15% restocking fee on non-defective goods; \$3.00 C.O.D. charge Shipping \$4.00 per item, less on bulk orders. (\$5.00 Blue Label).



IBM PC 256K, 1 or 2 floppies	IBM PC 30 + 30 256K, 1 or 2 floppies 20MB HD & 20MB Backup	IBM XT 10 + 10 256K, 1 or 2 floppies 10MB HD & 10MB Backup		IBM AT 30 + 30 512K, 1 or 2 floppies 20MB HD & 20MB Backup	COMPAG DESKPRO 10 MB 640K, 1 or 2 floppies	COMPAG PORTABLE 286 Custom Configurations
IBM PC 10 MB 256K, 1 or 2 floppies	IBM XT 256K 256K, 2 floppies	IBM XT 20 + 20 256K, 1 or 2 floppies 20MB HD & 20MB Backup		IBM AT 30 + 30 512K, 1 or 2 floppies 30MB HD & 30MB Backup	COMPAG DESKPRO 286 Custom Configurations	COMPAG DESKPRO 286 Custom Configurations
IBM PC 20 MB 256K, 1 or 2 floppies	IBM XT 10 MB 256K, 1 or 2 floppies	IBM AT 20 MB 512K, 1 or 2 floppies		IBM AT 40 + 60 512K, 1 or 2 floppies 40MB HD & 60MB Backup	COMPAG DESKPRO 30 MB Backup Available	IBM XT COMPATIBLE Custom Configurations
IBM PC 30 MB 256K, 1 or 2 floppies	IBM XT 20 MB 256K, 1 or 2 floppies	IBM AT 30 MB 512K, 1 or 2 floppies		COMPAG PORTABLE 256K, 1 or 2 floppies	COMPAG DESKPRO 30 MB Backup Available	IBM AT COMPATIBLE Custom Configurations
IBM PC 10 + 10 256K, 1 or 2 floppies 10MB HD & 10MB Backup	IBM XT 30 MB 256K, 1 or 2 floppies	IBM AT 40 MB 512K, 1 or 2 floppies		COMPAG PORTABLE 10 MB 256K, 1 or 2 floppies	COMPAG DESKPRO 40 MB Backup Available	IBM COMPATIBLES ARE YOUR LOW COST ALTERNATIVE

FOR EXTRA SAVINGS
Call for the latest prices for your custom configuration. All systems are configured and tested at no extra cost and come only with CompuLink's 90 day warranty.

★ PRICE WAR ★ CALL US LAST WITH YOUR BEST QUOTES ★

PRINTERS FLOPPY/HARD DISKS MONITORS MODEMS

EPSON Danyel (Hd-10/10K-15)
FX-85 + NLO \$339 FX-105 + NLO \$459
Slt Fax PC/FX-105 \$499
NLO Upgrade kit for FX-80/FX-105
CALL
LX-80/Hd-10K-JX-80 \$219/\$359/\$499
Tractor LX-80/Hd-10K-80 \$200/\$300/\$470
LX-1500 w/Parallel Interface \$899
LX-1500 w/Serial Data Str \$70/\$550/\$750
LX-90 w/Par Interface & Tractor \$279

OKINAKA **TOW LOW TO DUOTE**
OKIMATE 200 w/IBM Plug & Print \$199
182/P/182-IBM 182/P/182-IBM
193/P/193-IBM 193/P/193-IBM
193T Tractor \$70 \$84 Slt Fax \$390
TOSHIBA 1240P \$499
TOSHIBA 351P "REDCUED" \$499

361 Tractor/Shi Fax \$190/\$190
JUN611 100/200/4000 \$349/\$549/\$679
Color Tractor/Shi Fax \$150/\$250
5510P (160cps) \$369 5510 Color Kit \$150
BROTHER
HR 102/Hd-15XL \$100
HR 102 w/Parallel/Shi Fax \$259/Hd-15XL
HR 25P/Hd-15XL \$439/\$539
HR 25 Tractor/Shi Fax \$120/\$200
2024L Hd/Graphics 24 pin, 160/80 cps \$899
2024L Tractor/Narrow Wedge \$100
TWINBROTHERS World's First Dot Matrix
Printer with combined E&B Best Price
TWINBROTHERS Tractor/Shi Fax \$150/\$250
C. ION Printer/Printer w/HD \$319

8010EP \$309 8010SEEP + NLO \$379
8010SEEP + NLO \$449 1550-EP \$429
1502EP-Hd \$519 1502SEEP + NLO \$419
240CP \$949 410 XCP \$259
Y10-20P \$369 F10 Tractor \$160
F10-4CP \$89 F10-5CP \$109
F10 Tractor/Shi Fax \$190/\$290
QX-4800P 4 Pin Plotter \$429
CUMM LetterPro 20P (20 cps) \$389
20P Tractor/Shi Fax \$150/\$390
SPRINT 1140 + 1135 +
SPRINT Interface Module \$80
SPRINT Tractor/Shi Fax \$210/\$490
PHASORINK K1-P151 10 (20cps) \$459
K1-P150 90 + 90 \$379/\$249/\$349
Star Power Type/58 \$10
10/50/15 (120cps) \$239/\$389
10/50/15 (160cps) \$259/\$429
10/50/15 (200cps) \$299/\$499/\$599
NEC FINWRITER P-2/P-3
Shi Fax for P-2/P-3 \$300/\$420
2050/550/850 \$649/\$959/\$1299
SPRINTWRITER Tractor/Shi Fax
ELF 360 Pn (16cps) \$419
DIABLO Advantage 0-25 \$499
630-AP \$159 630-EC5-IBM \$199
Tractor/Match Speed Bin Str \$230/\$470
CITIZEN 18 months manufacturer warranty
MS-10/15 (160/40cps) \$299/\$449
MS-20/25 (200/50cps) \$349/\$549
LX-30 (Specify Model) \$229
LEADER CP-VII \$899 1200 \$759
180/100/1380/1385 \$199/\$219/\$259/\$319
ANAGRAM 9600R/9600R-58 \$1199/\$1299
9725B COLOR \$1399
WP6000/GH500 \$2299/\$2509
Analog Tractor/Shi Fax \$150/\$590
SILVER REED Parallel Modes \$199/\$590
400/550/550/770 \$189/\$259/\$379/\$669
TELEVIEW 750 Desktop-50 cps CALL
160/160/2400 Serial \$299
KENSINGTON Universal Printer Stand \$20

CD-ROM DISK/IBM/AMSONIC/TANDEM/TEAC
Hd/Ht/500MB "REDCUED" \$90
Call for more info. \$200
From Manufacturing kit with 2 drives
CALL
HARD DISKS FOR IBM PC/XT
10 MB Int w/Controller "REDCUED" \$649
20 MB Int w/Controller "REDCUED" \$699
30 MB Int w/Controller "REDCUED" \$749
40 MB Int w/Controller "REDCUED" \$799
50 MB Int w/Controller "REDCUED" \$849
60 MB Int w/Controller "REDCUED" \$899
70 MB Int w/Controller "REDCUED" \$949
80 MB Int w/Controller "REDCUED" \$999
90 MB Int w/Controller "REDCUED" \$1049
100 MB Int w/Controller "REDCUED" \$1099
110 MB Int w/Controller "REDCUED" \$1149
120 MB Int w/Controller "REDCUED" \$1199
130 MB Int w/Controller "REDCUED" \$1249
140 MB Int w/Controller "REDCUED" \$1299
150 MB Int w/Controller "REDCUED" \$1349
160 MB Int w/Controller "REDCUED" \$1399
170 MB Int w/Controller "REDCUED" \$1449
180 MB Int w/Controller "REDCUED" \$1499
190 MB Int w/Controller "REDCUED" \$1549
200 MB Int w/Controller "REDCUED" \$1599
210 MB Int w/Controller "REDCUED" \$1649
220 MB Int w/Controller "REDCUED" \$1699
230 MB Int w/Controller "REDCUED" \$1749
240 MB Int w/Controller "REDCUED" \$1799
250 MB Int w/Controller "REDCUED" \$1849
260 MB Int w/Controller "REDCUED" \$1899
270 MB Int w/Controller "REDCUED" \$1949
280 MB Int w/Controller "REDCUED" \$1999
290 MB Int w/Controller "REDCUED" \$2049
300 MB Int w/Controller "REDCUED" \$2099
310 MB Int w/Controller "REDCUED" \$2149
320 MB Int w/Controller "REDCUED" \$2199
330 MB Int w/Controller "REDCUED" \$2249
340 MB Int w/Controller "REDCUED" \$2299
350 MB Int w/Controller "REDCUED" \$2349
360 MB Int w/Controller "REDCUED" \$2399
370 MB Int w/Controller "REDCUED" \$2449
380 MB Int w/Controller "REDCUED" \$2499
390 MB Int w/Controller "REDCUED" \$2549
400 MB Int w/Controller "REDCUED" \$2599
410 MB Int w/Controller "REDCUED" \$2649
420 MB Int w/Controller "REDCUED" \$2699
430 MB Int w/Controller "REDCUED" \$2749
440 MB Int w/Controller "REDCUED" \$2799
450 MB Int w/Controller "REDCUED" \$2849
460 MB Int w/Controller "REDCUED" \$2899
470 MB Int w/Controller "REDCUED" \$2949
480 MB Int w/Controller "REDCUED" \$2999
490 MB Int w/Controller "REDCUED" \$3049
500 MB Int w/Controller "REDCUED" \$3099
510 MB Int w/Controller "REDCUED" \$3149
520 MB Int w/Controller "REDCUED" \$3199
530 MB Int w/Controller "REDCUED" \$3249
540 MB Int w/Controller "REDCUED" \$3299
550 MB Int w/Controller "REDCUED" \$3349
560 MB Int w/Controller "REDCUED" \$3399
570 MB Int w/Controller "REDCUED" \$3449
580 MB Int w/Controller "REDCUED" \$3499
590 MB Int w/Controller "REDCUED" \$3549
600 MB Int w/Controller "REDCUED" \$3599
610 MB Int w/Controller "REDCUED" \$3649
620 MB Int w/Controller "REDCUED" \$3699
630 MB Int w/Controller "REDCUED" \$3749
640 MB Int w/Controller "REDCUED" \$3799
650 MB Int w/Controller "REDCUED" \$3849
660 MB Int w/Controller "REDCUED" \$3899
670 MB Int w/Controller "REDCUED" \$3949
680 MB Int w/Controller "REDCUED" \$3999
690 MB Int w/Controller "REDCUED" \$4049
700 MB Int w/Controller "REDCUED" \$4099
710 MB Int w/Controller "REDCUED" \$4149
720 MB Int w/Controller "REDCUED" \$4199
730 MB Int w/Controller "REDCUED" \$4249
740 MB Int w/Controller "REDCUED" \$4299
750 MB Int w/Controller "REDCUED" \$4349
760 MB Int w/Controller "REDCUED" \$4399
770 MB Int w/Controller "REDCUED" \$4449
780 MB Int w/Controller "REDCUED" \$4499
790 MB Int w/Controller "REDCUED" \$4549
800 MB Int w/Controller "REDCUED" \$4599
810 MB Int w/Controller "REDCUED" \$4649
820 MB Int w/Controller "REDCUED" \$4699
830 MB Int w/Controller "REDCUED" \$4749
840 MB Int w/Controller "REDCUED" \$4799
850 MB Int w/Controller "REDCUED" \$4849
860 MB Int w/Controller "REDCUED" \$4899
870 MB Int w/Controller "REDCUED" \$4949
880 MB Int w/Controller "REDCUED" \$4999
890 MB Int w/Controller "REDCUED" \$5049
900 MB Int w/Controller "REDCUED" \$5099
910 MB Int w/Controller "REDCUED" \$5149
920 MB Int w/Controller "REDCUED" \$5199
930 MB Int w/Controller "REDCUED" \$5249
940 MB Int w/Controller "REDCUED" \$5299
950 MB Int w/Controller "REDCUED" \$5349
960 MB Int w/Controller "REDCUED" \$5399
970 MB Int w/Controller "REDCUED" \$5449
980 MB Int w/Controller "REDCUED" \$5499
990 MB Int w/Controller "REDCUED" \$5549
1000 MB Int w/Controller "REDCUED" \$5599
1010 MB Int w/Controller "REDCUED" \$5649
1020 MB Int w/Controller "REDCUED" \$5699
1030 MB Int w/Controller "REDCUED" \$5749
1040 MB Int w/Controller "REDCUED" \$5799
1050 MB Int w/Controller "REDCUED" \$5849
1060 MB Int w/Controller "REDCUED" \$5899
1070 MB Int w/Controller "REDCUED" \$5949
1080 MB Int w/Controller "REDCUED" \$5999
1090 MB Int w/Controller "REDCUED" \$6049
1100 MB Int w/Controller "REDCUED" \$6099
1110 MB Int w/Controller "REDCUED" \$6149
1120 MB Int w/Controller "REDCUED" \$6199
1130 MB Int w/Controller "REDCUED" \$6249
1140 MB Int w/Controller "REDCUED" \$6299
1150 MB Int w/Controller "REDCUED" \$6349
1160 MB Int w/Controller "REDCUED" \$6399
1170 MB Int w/Controller "REDCUED" \$6449
1180 MB Int w/Controller "REDCUED" \$6499
1190 MB Int w/Controller "REDCUED" \$6549
1200 MB Int w/Controller "REDCUED" \$6599
1210 MB Int w/Controller "REDCUED" \$6649
1220 MB Int w/Controller "REDCUED" \$6699
1230 MB Int w/Controller "REDCUED" \$6749
1240 MB Int w/Controller "REDCUED" \$6799
1250 MB Int w/Controller "REDCUED" \$6849
1260 MB Int w/Controller "REDCUED" \$6899
1270 MB Int w/Controller "REDCUED" \$6949
1280 MB Int w/Controller "REDCUED" \$6999
1290 MB Int w/Controller "REDCUED" \$7049
1300 MB Int w/Controller "REDCUED" \$7099
1310 MB Int w/Controller "REDCUED" \$7149
1320 MB Int w/Controller "REDCUED" \$7199
1330 MB Int w/Controller "REDCUED" \$7249
1340 MB Int w/Controller "REDCUED" \$7299
1350 MB Int w/Controller "REDCUED" \$7349
1360 MB Int w/Controller "REDCUED" \$7399
1370 MB Int w/Controller "REDCUED" \$7449
1380 MB Int w/Controller "REDCUED" \$7499
1390 MB Int w/Controller "REDCUED" \$7549
1400 MB Int w/Controller "REDCUED" \$7599
1410 MB Int w/Controller "REDCUED" \$7649
1420 MB Int w/Controller "REDCUED" \$7699
1430 MB Int w/Controller "REDCUED" \$7749
1440 MB Int w/Controller "REDCUED" \$7799
1450 MB Int w/Controller "REDCUED" \$7849
1460 MB Int w/Controller "REDCUED" \$7899
1470 MB Int w/Controller "REDCUED" \$7949
1480 MB Int w/Controller "REDCUED" \$7999
1490 MB Int w/Controller "REDCUED" \$8049
1500 MB Int w/Controller "REDCUED" \$8099
1510 MB Int w/Controller "REDCUED" \$8149
1520 MB Int w/Controller "REDCUED" \$8199
1530 MB Int w/Controller "REDCUED" \$8249
1540 MB Int w/Controller "REDCUED" \$8299
1550 MB Int w/Controller "REDCUED" \$8349
1560 MB Int w/Controller "REDCUED" \$8399
1570 MB Int w/Controller "REDCUED" \$8449
1580 MB Int w/Controller "REDCUED" \$8499
1590 MB Int w/Controller "REDCUED" \$8549
1600 MB Int w/Controller "REDCUED" \$8599
1610 MB Int w/Controller "REDCUED" \$8649
1620 MB Int w/Controller "REDCUED" \$8699
1630 MB Int w/Controller "REDCUED" \$8749
1640 MB Int w/Controller "REDCUED" \$8799
1650 MB Int w/Controller "REDCUED" \$8849
1660 MB Int w/Controller "REDCUED" \$8899
1670 MB Int w/Controller "REDCUED" \$8949
1680 MB Int w/Controller "REDCUED" \$8999
1690 MB Int w/Controller "REDCUED" \$9049
1700 MB Int w/Controller "REDCUED" \$9099
1710 MB Int w/Controller "REDCUED" \$9149
1720 MB Int w/Controller "REDCUED" \$9199
1730 MB Int w/Controller "REDCUED" \$9249
1740 MB Int w/Controller "REDCUED" \$9299
1750 MB Int w/Controller "REDCUED" \$9349
1760 MB Int w/Controller "REDCUED" \$9399
1770 MB Int w/Controller "REDCUED" \$9449
1780 MB Int w/Controller "REDCUED" \$9499
1790 MB Int w/Controller "REDCUED" \$9549
1800 MB Int w/Controller "REDCUED" \$9599
1810 MB Int w/Controller "REDCUED" \$9649
1820 MB Int w/Controller "REDCUED" \$9699
1830 MB Int w/Controller "REDCUED" \$9749
1840 MB Int w/Controller "REDCUED" \$9799
1850 MB Int w/Controller "REDCUED" \$9849
1860 MB Int w/Controller "REDCUED" \$9899
1870 MB Int w/Controller "REDCUED" \$9949
1880 MB Int w/Controller "REDCUED" \$9999
1890 MB Int w/Controller "REDCUED" \$10049
1900 MB Int w/Controller "REDCUED" \$10099
1910 MB Int w/Controller "REDCUED" \$10149
1920 MB Int w/Controller "REDCUED" \$10199
1930 MB Int w/Controller "REDCUED" \$10249
1940 MB Int w/Controller "REDCUED" \$10299
1950 MB Int w/Controller "REDCUED" \$10349
1960 MB Int w/Controller "REDCUED" \$10399
1970 MB Int w/Controller "REDCUED" \$10449
1980 MB Int w/Controller "REDCUED" \$10499
1990 MB Int w/Controller "REDCUED" \$10549
2000 MB Int w/Controller "REDCUED" \$10599
2010 MB Int w/Controller "REDCUED" \$10649
2020 MB Int w/Controller "REDCUED" \$10699
2030 MB Int w/Controller "REDCUED" \$10749
2040 MB Int w/Controller "REDCUED" \$10799
2050 MB Int w/Controller "REDCUED" \$10849
2060 MB Int w/Controller "REDCUED" \$10899
2070 MB Int w/Controller "REDCUED" \$10949
2080 MB Int w/Controller "REDCUED" \$10999
2090 MB Int w/Controller "REDCUED" \$11049
2100 MB Int w/Controller "REDCUED" \$11099
2110 MB Int w/Controller "REDCUED" \$11149
2120 MB Int w/Controller "REDCUED" \$11199
2130 MB Int w/Controller "REDCUED" \$11249
2140 MB Int w/Controller "REDCUED" \$11299
2150 MB Int w/Controller "REDCUED" \$11349
2160 MB Int w/Controller "REDCUED" \$11399
2170 MB Int w/Controller "REDCUED" \$11449
2180 MB Int w/Controller "REDCUED" \$11499
2190 MB Int w/Controller "REDCUED" \$11549
2200 MB Int w/Controller "REDCUED" \$11599
2210 MB Int w/Controller "REDCUED" \$11649
2220 MB Int w/Controller "REDCUED" \$11699
2230 MB Int w/Controller "REDCUED" \$11749
2240 MB Int w/Controller "REDCUED" \$11799
2250 MB Int w/Controller "REDCUED" \$11849
2260 MB Int w/Controller "REDCUED" \$11899
2270 MB Int w/Controller "REDCUED" \$11949
2280 MB Int w/Controller "REDCUED" \$11999
2290 MB Int w/Controller "REDCUED" \$12049
2300 MB Int w/Controller "REDCUED" \$12099
2310 MB Int w/Controller "REDCUED" \$12149
2320 MB Int w/Controller "REDCUED" \$12199
2330 MB Int w/Controller "REDCUED" \$12249
2340 MB Int w/Controller "REDCUED" \$12299
2350 MB Int w/Controller "REDCUED" \$12349
2360 MB Int w/Controller "REDCUED" \$12399
2370 MB Int w/Controller "REDCUED" \$12449
2380 MB Int w/Controller "REDCUED" \$12499
2390 MB Int w/Controller "REDCUED" \$12549
2400 MB Int w/Controller "REDCUED" \$12599
2410 MB Int w/Controller "REDCUED" \$12649
2420 MB Int w/Controller "REDCUED" \$12699
2430 MB Int w/Controller "REDCUED" \$12749
2440 MB Int w/Controller "REDCUED" \$12799
2450 MB Int w/Controller "REDCUED" \$12849
2460 MB Int w/Controller "REDCUED" \$12899
2470 MB Int w/Controller "REDCUED" \$12949
2480 MB Int w/Controller "REDCUED" \$12999
2490 MB Int w/Controller "REDCUED" \$13049
2500 MB Int w/Controller "REDCUED" \$13099
2510 MB Int w/Controller "REDCUED" \$13149
2520 MB Int w/Controller "REDCUED" \$13199
2530 MB Int w/Controller "REDCUED" \$13249
2540 MB Int w/Controller "REDCUED" \$13299
2550 MB Int w/Controller "REDCUED" \$13349
2560 MB Int w/Controller "REDCUED" \$13399
2570 MB Int w/Controller "REDCUED" \$13449
2580 MB Int w/Controller "REDCUED" \$13499
2590 MB Int w/Controller "REDCUED" \$13549
2600 MB Int w/Controller "REDCUED" \$13599
2610 MB Int w/Controller "REDCUED" \$13649
2620 MB Int w/Controller "REDCUED" \$13699
2630 MB Int w/Controller "REDCUED" \$13749
2640 MB Int w/Controller "REDCUED" \$13799
2650 MB Int w/Controller "REDCUED" \$13849
2660 MB Int w/Controller "REDCUED" \$13899
2670 MB Int w/Controller "REDCUED" \$13949
2680 MB Int w/Controller "REDCUED" \$13999
2690 MB Int w/Controller "REDCUED" \$14049
2700 MB Int w/Controller "REDCUED" \$14099
2710 MB Int w/Controller "REDCUED" \$14149
2720 MB Int w/Controller "REDCUED" \$14199
2730 MB Int w/Controller "REDCUED" \$14249
2740 MB Int w/Controller "REDCUED" \$14299
2750 MB Int w/Controller "REDCUED" \$14349
2760 MB Int w/Controller "REDCUED" \$14399
2770 MB Int w/Controller "REDCUED" \$14449
2780 MB Int w/Controller "REDCUED" \$14499
2790 MB Int w/Controller "REDCUED" \$14549
2800 MB Int w/Controller "REDCUED" \$14599
2810 MB Int w/Controller "REDCUED" \$14649
2820 MB Int w/Controller "REDCUED" \$14699
2830 MB Int w/Controller "REDCUED" \$14749
2840 MB Int w/Controller "REDCUED" \$14799
2850 MB Int w/Controller "REDCUED" \$14849
2860 MB Int w/Controller "REDCUED" \$14899
2870 MB Int w/Controller "REDCUED" \$14949
2880 MB Int w/Controller "REDCUED" \$14999
2890 MB Int w/Controller "REDCUED" \$15049
2900 MB Int w/Controller "REDCUED" \$15099
2910 MB Int w/Controller "REDCUED" \$15149
2920 MB Int w/Controller "REDCUED" \$15199
2930 MB Int w/Controller "REDCUED" \$15249
2940 MB Int w/Controller "REDCUED" \$15299
2950 MB Int w/Controller "REDCUED" \$15349
2960 MB Int w/Controller "REDCUED" \$15399
2970 MB Int w/Controller "REDCUED" \$15449
2980 MB Int w/Controller "REDCUED" \$15499
2990 MB Int w/Controller "REDCUED" \$15549
3000 MB Int w/Controller "REDCUED" \$15599
3010 MB Int w/Controller "REDCUED" \$15649
3020 MB Int w/Controller "REDCUED" \$15699
3030 MB Int w/Controller "REDCUED" \$15749
3040 MB Int w/Controller "REDCUED" \$15799
3050 MB Int w/Controller "REDCUED" \$15849
3060 MB Int w/Controller "REDCUED" \$15899
3070 MB Int w/Controller "REDCUED" \$15949
3080 MB Int w/Controller "REDCUED" \$15999
3090 MB Int w/Controller "REDCUED" \$16049
3100 MB Int w/Controller "REDCUED" \$16099
3110 MB Int w/Controller "REDCUED" \$16149
3120 MB Int w/Controller "REDCUED" \$16199
3130 MB Int w/Controller "REDCUED" \$16249
3140 MB Int w/Controller "REDCUED" \$16299
3150 MB Int w/Controller "REDCUED" \$16349
3160 MB Int w/Controller "REDCUED" \$16399
3170 MB Int w/Controller "REDCUED" \$16449
3180 MB Int w/Controller "REDCUED" \$16499
3190 MB Int w/Controller "REDCUED" \$16549
3200 MB Int w/Controller "REDCUED" \$16599
3210 MB Int w/Controller "REDCUED" \$16649
3220 MB Int w/Controller "REDCUED" \$16699
3230 MB Int w/Controller "REDCUED" \$16749
3240 MB Int w/Controller "REDCUED" \$16799
3250 MB Int w/Controller "REDCUED" \$16849
3260 MB Int w/Controller "REDCUED" \$16899
3270 MB Int w/Controller "REDCUED" \$16949
3280 MB Int w/Controller "REDCUED" \$16999
3290 MB Int w/Controller "REDCUED" \$17049
3300 MB Int w/Controller "REDCUED" \$17099
3310 MB Int w/Controller "REDCUED" \$17149
3320 MB Int w/Controller "REDCUED" \$17199
3330 MB Int w/Controller "REDCUED" \$17249
3340 MB Int w/Controller "REDCUED" \$17299
3350 MB Int w/Controller "REDCUED" \$17349
3360 MB Int w/Controller "REDCUED" \$17399
3370 MB Int w/Controller "REDCUED" \$17449
3380 MB Int w/Controller "REDCUED" \$17499
3390 MB Int w/Controller "REDCUED" \$17549
3400 MB Int w/Controller "REDCUED" \$17599
3410 MB Int w/Controller "REDCUED" \$17649
3420 MB Int w/Controller "REDCUED" \$17699
3430 MB Int w/Controller "REDCUED" \$17749
3440 MB Int w/Controller "REDCUED" \$17799
3450 MB Int w/Controller "REDCUED" \$17849
3460 MB Int w/Controller "REDCUED" \$17899
3470 MB Int w/Controller "REDCUED" \$17949
3480 MB Int w/Controller "REDCUED" \$17999
3490 MB Int w/Controller "REDCUED" \$18049
3500 MB Int w/Controller "REDCUED" \$18099
3510 MB Int w/Controller "REDCUED" \$18149
3520 MB Int w/Controller "REDCUED" \$18199
3530 MB Int w/Controller "REDCUED" \$18249
3540 MB Int w/Controller "REDCUED" \$18299
3550 MB Int w/Controller "REDCUED" \$18349
3560 MB Int w/Controller "REDCUED" \$18399
3570 MB Int w/Controller "REDCUED" \$18449
3580 MB Int w/Controller "REDCUED" \$18499
3590 MB Int w/Controller "REDCUED" \$18549
3600 MB Int w/Controller "REDCUED" \$18599
3610 MB Int w/Controller "REDCUED" \$18649
3620 MB Int w/Controller "REDCUED" \$18699
3630 MB Int w/Controller "REDCUED" \$18749
3640 MB Int w/Controller "REDCUED" \$18799
3650 MB Int w/Controller "REDCUED" \$18849
3660 MB Int w/Controller "REDCUED" \$18899
3670 MB Int w/Controller "REDCUED" \$18949
3680 MB Int w/Controller "REDCUED" \$18999
3690 MB Int w/Controller "REDCUED" \$19049
3700 MB Int w/Controller "REDCUED" \$19099
3710 MB Int w/Controller "REDCUED" \$19149
3720 MB Int w/Controller "REDCUED" \$19199
3730 MB Int w/Controller "REDCUED" \$19249
3740 MB Int w/Controller "REDCUED" \$19299
3750 MB Int w/Controller "REDCUED" \$19349
3760 MB Int w/Controller "REDCUED" \$19399
3770 MB Int w/Controller "REDCUED" \$19449
3780 MB Int w/Controller "REDCUED" \$19499
3790 MB Int w/Controller "REDCUED" \$19549
3800 MB Int w/Controller "REDCUED" \$19599
3810 MB Int w/Controller "REDCUED" \$19649
3820 MB Int w/Controller "REDCUED" \$19699
3830 MB Int w/Controller "REDCUED" \$19749
3840 MB Int w/Controller "REDCUED" \$19799
3850 MB Int w/Controller "REDCUED" \$19849
3860 MB Int w/Controller "REDCUED" \$19899
3870 MB Int w/Controller "REDCUED" \$19949
3880 MB Int w/Controller "REDCUED" \$19999
3890 MB Int w/Controller "REDCUED" \$20049
3900 MB Int w/Controller "REDCUED" \$20099
3910 MB Int w/Controller "REDCUED" \$20149
3920 MB Int w/Controller "REDCUED" \$20199
3930 MB Int w/Controller "REDCUED" \$20249
3940 MB Int w/Controller "REDCUED" \$20299
3950 MB Int w/Controller "REDCUED" \$20349
3960 MB Int w/Controller "REDCUED" \$20399
3970 MB Int w/Controller "REDCUED" \$20449
3980 MB Int w/Controller "REDCUED" \$20499
3990 MB Int w/Controller "REDCUED" \$20549
4000 MB Int w/Controller "REDCUED" \$20599
4010 MB Int w/Controller "REDCUED" \$20649
4020 MB Int w/Controller "REDCUED" \$20699
4030 MB Int w/Controller "REDCUED" \$20749
4040 MB Int w/Controller "REDCUED" \$20799
4050 MB Int w/Controller "REDCUED" \$20849
4060 MB Int w/Controller "REDCUED" \$20899
4070 MB Int w/Controller "REDCUED" \$20949
4080 MB Int w/Controller "REDCUED" \$20999
4090 MB Int w/Controller "REDCUED" \$21049
4100 MB Int w/Controller "REDCUED" \$21099
4110 MB Int w/Controller "REDCUED" \$21149
4120 MB Int w/Controller "REDCUED" \$21199
4130 MB Int w/Controller "REDCUED" \$21249
4140 MB Int w/Controller "REDCUED" \$21299
4150 MB Int w/Controller "REDCUED" \$21349
4160 MB Int w/Controller "REDCUED" \$21399
4170 MB Int w/Controller "REDCUED" \$21449
4180 MB Int w/Controller "REDCUED" \$21499
4190 MB Int w/Controller "REDCUED" \$21549
4200 MB Int w/Controller "REDCUED" \$21599
4210 MB Int w/Controller "REDCUED" \$21649
4220 MB Int w/Controller "REDCUED" \$21699
4230 MB Int w/Controller "REDCUED" \$21749
4240 MB Int w/Controller "REDCUED" \$21799
4250 MB Int w/Controller "REDCUED" \$21849
4260 MB Int w/Controller "REDCUED" \$21899
4270 MB Int w/Controller "REDCUED" \$21949
4280 MB Int w/Controller "REDCUED" \$21999
4290 MB Int w/Controller "REDCUED" \$22049
4300 MB Int w/Controller "REDCUED" \$22099
4310 MB Int w/Controller "REDCUED" \$22149
4320 MB Int w/Controller "REDCUED" \$22199
4330 MB Int w/Controller "REDCUED" \$22249
4340 MB Int w/Controller "REDCUED" \$22299
4350 MB Int w/Controller "REDCUED" \$22349
4360 MB Int w/Controller "REDCUED" \$22399
4370 MB Int w/Controller "REDCUED" \$22449
4380 MB Int w/Controller "REDCUED" \$22499
4390 MB Int w/Controller "REDCUED" \$22549
4400 MB Int w/Controller "REDCUED" \$22599
4410 MB Int w/Controller "REDCUED" \$22649
4420 MB Int w/Controller "REDCUED" \$22699
4430 MB Int w/Controller "REDCUED" \$22749
4440 MB Int w/Controller "REDCUED" \$22799
4450 MB

Index To Advertisers

RS #	Advertisers	Page	RS #	Advertisers	Page	RS #	Advertisers	Page	RS #	Advertisers	Page
234	Allen Harris Industries	90	117	Discount Computer Centers	162	385	Lifetech Software Inc.	195	132	Polaris	182
143	Alpha Software	13	239	Disk Jockey	218	334	Light Software	196	*	Potomac Pacific Engineering	4
138	Analytics International Inc.	224	244	DISK WORLD!, Inc.	72	282	Logisoft	82	123	Precision Data Products	220
371	Ares Technology Inc.	41	240	DISK WORLD!, Inc.	216	*	Lons	26-27	187	Primavera Systems	64
151	Arlington Computer Products	204	130	DISK WORLD!, Inc.	200	387	Magnus PC	217	188	Programs Plus	89
101	AST Research, Inc.	102	289	Dynas Corporation	14	165	Main Street Computer Corp.	207	366	Progressive Micro	
104	AST Research, Inc.	12	197	Electronic Protection Devices	143	378	Mansfield Software Group	182		Distributors	24-25
155	Atracoms	188	208	Elite Software	188	166	Martin Marietta	73	139	Proton	29
107	Bay Express Company	189		Emerald Systems Corp.	18-19	216	Matrix Software Technology	3	*	Quad Software Limited	222
112	Beilco	244	133/134	Enertronics Research	30-31	230	Mastell Corporation of America	1	235	Quib	2-3
173	Belbether Software	193	163	Event Systems	9	157	Maynard Electronics	39	169	RealWorld Corporation	5
103	Bilsh Software, Inc.	188	162	Express Systems	257-258	168	MCBS	219	154	Satellite Software	
341	Bit Development	36	242	47st Computer	214-215	320	MicroDynamics	223		International	32
47	Borland International	171	392	Finot Group	86	311	Microfilm	58	470	SBT Corp.	21
149	Borland International	173	177	Flagstaff Engineering	154	332	Microfronts	218	192	Sever Technology	75
115	Brightbill-Roberts and Co., Ltd.	121	247	Fox & Geller	67	*	Microsoft	177	347	Sigma Designs, Inc.	69
*	Business Computers	71	250	FTG Data Systems	16	*	Microsoft	179	*	Softlink Corp.	70
152	Central Point Software, Inc.	101	252	Garden of Eden Computers	61	326	Microstar, Inc.	8	514	Softstyle	99
184	Chorus Data Systems	40	109	Gen Electronics	92	212	Microstar, Inc.	99	172	Software Bottling Company	155
150	CIA	103	136	Glenn Engineering	120	213	Microstar, Inc.	101	171	Software Bottling Company	157
182	Command Technology Corp.	203	232	Gould, Inc.	144	214	Microstar, Inc.	103	393	Software Link, Inc.	57
228	CompuAdd	196-199	229	GTE Telenet Communications Corp.	93	331	MicroWay	28	*	Software Publishing	42
205	Compulistics	255	319	Gulfstream Micro Systems	78	159	MicroWay	20	156	Software Support	197
*	COMPUMAIL	256	260	H&E Compenetics, Inc.	260	340	MLI Microsystems	85	135	Spectrum Holobyte	142
114	Computer Hut	74	145	Hercules Computer Technology	161	293	Mountain Computer, Inc.	128-129	196	Starbridge Technologies	87
306	Computer Identities	212	146	Hercules Computer Technology	161	167	Multitech Electronics	85	245	STSC, Inc.	52
185	Computer Mail Order	76-77	146	Hercules Computer Technology	138	161	North America Mica, Inc.	246	140	Summa Graphics	183
183	Computer Mart	74	158	Hypertext	88	126	Northeastern Software	66	222	Systems Compatibility Corp.	196
374	Computer Peripherals, Inc.	158	270	IBM Corp.	104-105	346	Norton Utilities	185	*	Systems Management Assoc.	62
175	Connecticut Software	247	273	Information Builders, Inc.	65	351	Oryx Systems, Inc.	94-95	227	TDK Electronics	79
125	Conroy-La Pointe, Inc.	45	263	In-House Software	44	363	Oryx Systems, Inc.	94-95	386	Tecmar Inc.	C-2
121	Contemporary Computer West	85	299	ITT Information Systems	184	*	Paradise Systems, Inc.	47	237	Tecmar Inc.	C-4
225	Core International	187	*	James River Group, The	194	141	PC Brand	23-23	206	Telesoft	see Telemat
218	Cosmos	80	160	Jeden	60	339	PC Connection	132-135	206	Telemat	228
381	Creative Microsales	210	343	K Software House	244	207	PC Network	48-51	142	Value Line, Inc.	97
148	Dac Software, Inc.	17	317	Kannerman Labs	10	144	PC Software Interest Group	220	*	Warehouse Data	
196	David Aldridge Co.	11	113	Larrier, Inc.	156	164	PC's Limited	54-55	204	Products	180
						102	Personal Computer Products	185	216	WaveMate	221
									176	XyQuest, Inc.	205

PC MAGAZINE ADVERTISING SALES STAFF

Eugene Duncan - Advertising Director
 Pauline Scherer - Advertising Sales Manager/Telemarketing
 Miriam Hernandez - Assistant to the Advertising Director
 Advertising Coordinators: Robert Simpson, Jeanne Woodcock
 1 Park Avenue, New York, NY 10016 (212) 503-5100

MA, NH, VT, ME, RI, CT
 Kathy Krochta - District Manager
 160 State Street
 Boston, MA 02109
 (617) 367-7190
 John Bucknaway - Account Representative
 (212) 503-5100
 SC, NJ, DE, MD, DC, VA, WV, NC, SC, AL, MS, LA, TN, AR, KY, PA, GA
 Bob Ostrow - District Manager
 1 Park Avenue
 New York, NY 10016
 (212) 503-5100
 Lauren Morse - Account Representative
 (212) 503-5100

NY, No. NJ, FL
 Ellen Atkinson - District Manager
 1 Park Avenue
 New York, NY 10016
 (212) 503-5100
 Joel Zuckerman - Account Representative
 (212) 503-5100
 OK, NE, WI, IL, IN, MN, KS, MO, OH, MI, IA, ND, SD, Canada
 John Henshaw - District Manager
 180 N. Michigan Avenue Suite 1400
 Chicago, IL 60601
 (312) 466-2600
 Michael Tapanian - Account Representative
 (212) 503-5100

Jeff Miller - Western Advertising Manager
 CA (San Francisco & North), OR, WA
 Dave Riegler - District Manager
 11 Davis Drive
 Belmont, CA 94002
 (415) 598-2341
 Janet Bell - Account Representative
 (212) 503-5100
 CA (Santa Barbara to So. San Francisco), CO, ID, MT, UT, AK, NV
 Jeff Cohen - District Manager
 11 Davis Drive
 Belmont, CA 94002
 (415) 598-2341
 Jane Anderson - Account Representative
 (212) 503-5100

CA (Orange County), AZ, NM, TX
 Page Goodrich - District Manager
 1601 Dove Street
 Newport Beach, CA 92660
 (714) 476-0749
 Sam Johnson - Account Representative
 (212) 503-5100
 CA (Los Angeles & San Diego), HI
 Steve Lincoln - District Manager
 3460 Wilshire Blvd.
 Los Angeles, CA 90010
 (213) 387-2100
 Joanne Boorne - Account Representative
 (212) 503-5100

C *Low power* **Complete hard disk kit \$395**

Comes complete with virtually the identical controller that's in the IBM[®] XT, and Xerox[®] warranties the hard disk for one year

Guaranteed 100 percent IBM PC compatible

How can we offer this fantastic price? Simple. We buy in such volume that even the most avicious hard disk businessmen understand they have to give us the best price possible. We could pocket the difference, but we don't.

Instead, we put the extra profit into our testing facilities. That's why Xerox guarantees our \$395 10 megabyte hard disk for one year.

Xerox knows, as our customers know, that we have an extensive testing program. Here is what we contribute toward giving you the maximum hard disk performance.

Best Drives Available

First, we buy the best drives available. Sounds trite, doesn't it? I mean, a drive's a drive—right? Hardly. You should see some of the junk we get in our labs. Some have such high failure rates that we even questioned our own \$10,000 hard disk tester. But when we tested other manufacturers' drives we were assured that our equipment was fine, which just confirmed that the bad hard disks were not only bad—they were real bad.

But that's just the weeding out process. We then take each drive that we've put through our tester and test it again with the controller you've requested. We call this a "DOS drain."

DOS Doesn't Do It

In case you're thinking that all

this is an unnecessary duplication of what DOS does for you, let me explain the disk facts of life.

If DOS did what you may think it is supposed to do when you format the disk, DOS would map around these bad areas. Unfortunately, DOS doesn't do this.

DOS 2.0 and 2.1 can't enter the bad tracks. DOS 3.0 can, but only on the IBM AT. Unfortunately, as the press has so well documented, the AT's hard disk develops bad tracks later on.

We do what DOS can't

We believe the problem is so bad, we use a software program that performs a powerful test of your disk drive on all of the IBM or IBM compatible computers—PCs,XTs, and ATs. Our format takes hours to analyze the disk. But when we finish, you know that the bad tracks are really mapped out so you won't write good data that will disappear into a black hole. We even send you a printed statement of our test results.

Our software allows you to type in the bad track locations from the list supplied by the manufacturers, so you'll never write good data to them—even if DOS didn't identify them as bad. The software even lets you save the location of these bad sections to a file, so that you can reformat your disk without spending hours retesting.

We even include a program that will give you continuous comments on the status of your hard disk. No more waiting for that catastrophic failure.

Average Access Time

As you might suspect, some hard disks are faster than others in their ability to move from one track of data to another. The time it takes the hard disk to move one-half way between the beginning of the disk to the end is called the "average access time."

The first generation of 10 megabyte hard disks had average access times of 80-85 milliseconds (msec). But computer users love speed, and guess what—the average access time for the new 20 megabyte hard disk in the IBM AT is only 40 msec. (We sell an AT equivalent with only 30 msec access time!)

There are some legitimate reasons for the shorter access time. It's particularly helpful when there are multiple users on the same hard disk. It's also important when running a compiler. But remember, before you get too wrapped up in the access speed, there's always that ST 506 interface which won't let data transfer from the hard disk to the computer any faster than 5 megabits/second. We've bypassed that choke hole, too. If you want the functional equivalent of a Ferrarri with a turbocharger, order our 10 Mbit per second 100

megabyte hard disk with 18 msec of average access speed.

Compatibility

To be sure that your hard disk is 100 percent compatible with these IBM XT you don't need to buy the same hard disk that's in the XT. You can't even be sure what brand hard disk it is because IBM, like Express Systems, goes into the marketplace and buys hard disks from several vendors. However, they buy their XT hard disk controller from only one vendor—the same one we do.

You can buy the IBM XT controller from IBM for \$495 or you can buy from us, the functionally equivalent, manufactured by the same company that makes it for IBM for only \$195. Is it the exactly identical IBM XT controller? No, it's better. First, it takes less power, and secondly, it cannot control from 5 to 32 megabytes—the IBM controller cannot work with only 10 megabytes. It is 100 percent IBM XT compatible, and 100 percent is 100 percent. If you want to save a slot, we carry a version that lets you operate two hard disks and two floppy disk drives.

More than 32 Megabytes

You can operate with more than 32 megabytes (the limit of DOS) through the use of "device drivers." Express Systems can supply you with device drivers for our hard disks for over 32 megabytes formatted. But, if you don't have individual files, or databases that are large, you might want to consider one of our controllers that can divide our 65 megabytes (formatted) hard disk into two equal volumes of 32 megabytes each.

Reliability

We offer you a choice between iron oxide and plated media—the stuff that covers the hard disk and gives it its magnetic properties. Iron oxide is, well, it's rust. If you inadvertently joust your disk, you may cause the low flying head to dig out some iron oxide. A little rust flake can ruin your whole day. Plated media is more resistant to damage, and if it happens, less data is lost.

We offer both types of hard disks. The iron oxide is older



technology, and quite frankly, manufacturers understand it better. Their better understanding, combined with some of the special head locking mechanisms, gives us peace of mind when we sell you one.

Power

Hard disks consume power. Our small, half-high hard disks consume so little power that you can use them with your existing IBM PC power supply. If you plan to use lots of slots, you'll want to increase your power supply to be safe. We offer the same amount of power for your PC that comes in the XT.

Our Customers

Some folks just never feel comfortable buying mail order. They forget that Sears began as a mail order house or that IBM is now into mail order. But, if it helps, here is a *partial* list of customers who have felt comfortable to buy from us.

IBM	Sears
American Express	Honeywell
U.S. Army	MIT
AT&T (Bell Labs)	RCA
Bausch & Lomb	Lockheed
Xerox	Sperry

Easy to Install

If you're like most of us, raised on the boob tube rather than the Great Books, you'd rather see the movie than read the book. Well, now you can choose to read our installation manual or for only \$9.95 more, you can get a VHS or Beta video cassette showing the simple steps for installation.



Our VHS or Beta Cassettes make installation easy.

Warranty

We offer you a one year warranty on our hard disks—the same as IBM on the AT and 90 days on the tape drives. (It's all the manufacturer gives us.) If



Complete Hard Disk Kits

Formatted MB	Height	Plated Media	Average Access	Transfer Rate	PC or PC/XT	AT
10	1/2	no	85 msec	5 Mbits/s	\$ 395	\$ N/A
10	5/8	yes	85 msec	5 Mbits/s	\$ 495	\$ N/A
21	5/8	yes	85 msec	5 Mbits/s	\$ 795	\$ 595
21	Full	no	30 msec	5 Mbits/s	\$ 1,535	\$ 1,340
32	1/2	yes	85 msec	5 Mbits/s	\$ 995	\$ 795
32	Full	no	30 msec	5 Mbits/s	\$ 1,775	\$ 1,575
65	Full	no	30 msec	5 Mbits/s	\$ 2,295	\$ 2,070
110	Full	yes	18 msec	10 Mbits/s	\$ 4,995	\$ 4,995



Removable Hard Disk

10	5/8	no	90 msec	5 Mbits/s	\$ 1,095	N/A
----	-----	----	---------	-----------	----------	-----



Tape Systems and Subsystems

Formatted Storage Capacity	Height	Data Transfer Rate (K SEC)	PC or PC/XT	AT
60 Mbytes	1/2	88	\$ 995	\$ 995
60 Mbytes Subsystem		88	\$ 1,295	\$ 1,295
21 Mbytes (unformatted) Start/stop Subsystem		24	\$ 595	\$ 595
26 Mbytes Floppy Tape [®] Subsystem		31	\$ 749	\$ 749



Controllers

All of our hard disk and tape controllers are available separately. Please call for prices.

Subsystem Chassis

Any of our disk or tape units are available in an external subsystem for an additional \$250.00. You can mix & match any of our 5 1/4 high hard disks or tape drives together or add any single full height hard disk.



Tape Cartridges

Express Certified 555 foot 300 Hci 1/2-inch Data Cartridge \$35.00

Power Supply

130 Watt Power supply \$75.00^{*}
150 Watt Power supply \$125.00

^{*}with the purchase of any drive

More questions?

Because we spend so much attention on the front end with ensuring that our drives will arrive in working order, we have a customer service department that, unlike many of our competitors, has little to do. When you need us, you won't get a constant busy signal.

Call our friendly, knowledgeable customer service staff to get answers to your questions—before or after the sale. Our people, who know the PC, can talk you through the sticky parts, and they'll respond to you quickly. Just call us.

How to order

Pick up the telephone and call 1-800-341-7549, to order. We accept Master Card, VISA, American Express and Diners Club. Or send a cashier's check or

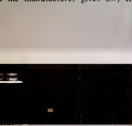


money order (We'll take a check, but you'll have to wait for it to clear) and tell us if you want one of our recommended configurations or you want to mix and match yourself. Corporations with a DUNS number may send purchase orders for quantities over five.

EXPRESS SYSTEMS

Call Toll Free 1-800-341-7549 Ext. 1200
In Illinois call (312) 882-7733 Ext. 1200

Express Systems, Inc., 1254 Remington, Schaumburg, IL 60195
CIRCLE 162 ON READER SERVICE CARD



Introducing the Most Powerful Business Software Ever!

TRS-80™ (Model I, II, III, or 16) • APPLE™ • IBM™ • OSBORNE™ • CP/M™ • XEROX™



The VERSABUSINESS™ Series

Each VERSABUSINESS module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

VERSARECEIVABLES™

\$99.95

VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

VERSAPAYABLES™

\$99.95

VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSAPAYROLL™

\$99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

VERSAINVENTORY™

\$99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints inventory listings, reports of items below reorder point, inventory value reports, and date sales reports, price lists, inventory checklists, etc.

VERSALEDGER II™

\$149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system without any additional software.

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

CIRCLE 260 ON READER SERVICE CARD

SATISFACTION GUARANTEED!

Every VERSABUSINESS™ module is guaranteed to outperform all other competition systems, and at a fraction of their cost. If you are not satisfied with any VERSABUSINESS™ module, you may return it within 30 days for a refund. Manuals for any VERSABUSINESS™ module may be purchased for \$25 each, credited toward a later purchase of that module.

To Order:

Write or call Toll-free (800) 431-2818

(N.Y.N. residents call 914-423-1335)

* add \$3 for shipping in UPS areas

* add \$5 to CANADA or MEXICO

* add \$4 for C.O.D. or non-UPS areas

* add proper postage elsewhere

DEALER INQUIRIES WELCOME

All prices and specifications subject to change. Delivery subject to availability.

PUTRONICS

10000 ROCK ROAD, SPRING VALLEY, N.Y. 10977

Trademark of the Radio Shack Division of Tandy Corp. *APPLE is a trademark of Apple Corp.

*IBM is a trademark of IBM Corp.

*OSBORNE is a trademark of Osborne Corp.

*CP/M is a trademark of Digital Research. *XEROX is a trademark of Xerox Corp.



CIRCLE 216 ON READER SERVICE CARD

For the IBM PC and 100% compatibles with a minimum of 128K memory and one floppy disk drive.

PRODUCTS BEYOND THE STATE OF THE ART™
MATRIX SOFTWARE TECHNOLOGY CORPORATION
50 Milk Street, Boston, MA 02109 (617) 350-6614

- ☐ Word Processor/Spelling Checker ☐ Telecommunications
- ☐ Spreadsheet ☐ Graphics ☐ Database Management
- ☐ Desktop Manager ☐ Windowing ☐ Total Integration
- ☐ 128 K Memory ☐ \$295.00

IT WILL TURN THE WORLD UPSIDE DOWN

GENESIS™

MATRIX™



Information please...



Introducing Phonegate, The High-Speed Internal Modem That Delivers More than 2400 Baud

Phonegate 2400 is the first modem to offer you data transmission speeds from 300 to 2400 baud, providing ultimate operating flexibility. And it's also the first modem capable of touch tone decoding which can be used for remote data entry.

You also get automatic dial and answer, toggling between voice and data transmission, on-screen status monitoring, Hayes[®] compatibility, and the ability to automatically suspend operation of the program you're currently running and put your phone directory on screen just by picking up the handset of your telephone.

Included FREE is the powerful "Respond"[™] communications software, capable of emulating seven different asynchronous terminals and allowing you to run your PC unattended from a remote PC. Also, with this version of Respond, you will receive Tecmar's Telephone Management

Software which provides directory assistance and a speed dialer.

Best of all, Phonegate 2400 has been engineered to be fully compatible with present and future Tecmar communications products. And every board has a one-year warranty for your protection.

To learn more about Phonegate 2400 or other Tecmar quality products, call **216/349-1009**.



TECMAR

Tecmar, Inc. 6225 Cochran Road Solon, Ohio 44139

CIRCLE 237 ON READER SERVICE CARD

Respond is a trademarked product of Software Synergy, Inc. Hayes is a registered trademark of Hayes Microcomputer Products, Inc.